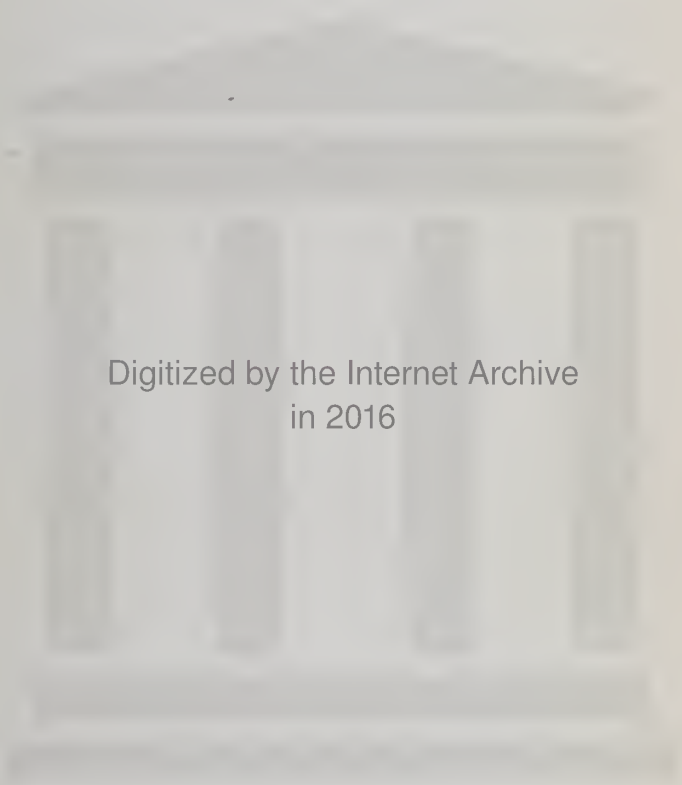
PER AS 472 .A84 v.3

Journal of the Asiatic
Society of Bengal

LIBRARY RL
OF THE
Theological Seminary.
PRINCETON, N. J.

Case
Shelf
Book

Division I
Section 5



Digitized by the Internet Archive
in 2016

https://archive.org/details/journalofasiatic327asia

THE

JOURNAL

OF

THE ASIATIC SOCIETY

OF

BENGAL.

VOL. III.

THE

JOURNAL

OF

THE ASIATIC SOCIETY

OF

BENGAL.

EDITED BY

JAMES PRINSEP, F. R. S.

SECRETARY OF THE AS. SOC., AND HON. MEM. OF THE AS. SOC. OF PARIS.

VOL. III.

JANUARY TO DECEMBER,

1834.

"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta; it will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease."

SIR WM. JONES.

Calcutta:

PRINTED AT THE BAPTIST MISSION PRESS, CIRCULAR ROAD.

SOLD BY MESSRS. THACKER AND CO., ST. ANDREW'S LIBRARY.

1834.

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 27.—*March*, 1834.

I.—*A Description, with Drawings, of the Ancient Stone Pillar at Allahabad called Bhim Sén's Gadá or Club, with accompanying copies of four inscriptions engraven in different characters upon its surface. By Lieut.* T. S. Burt, *Engineers.*

[Read at the meeting of the 26th December 1833.]

In compliance with your request made some time since, that I would prepare copies of the characters engraven on an ancient pillar lying in the Fort of Allahabad, I have much pleasure in forwarding them, together with a geometrical and an explanatory drawing of the stone, (Plate III. et. seq.), which shew the situations occupied by each of the characters on the upper surface, as well as sections and elevations of the capital, which lies detached near to the top of the shaft.

The column tapers from the base to the capital from a diameter at the former of three feet two and quarter inches, to two feet two inches at the latter; the circumference of the first mentioned part is about ten feet one inch, and of the last, six feet six and a quarter inches. This was about the size of the Delhi *lath* of Firoz Shah, which is stated to be ten feet four in circumference, and thirty-seven feet long, [see As. Res. vol. VII. p. 178;] the shaft of this one being thirty-five, and its total length, including the base, forty-two feet seven inches.

It appears to be a hard kind of red sandstone, nearly approaching to freestone, (and not granite,) and bears a kind of silvery bed in it, which accounts for its having peeled off at several places as hereafter noticed.

The common legend of the natives states the pillar to be the *gadá* or staff of Bhim Sen. It may be hardly necessary to state, that Bhim

Sen was the second brother of Raja Yudhisthira, or Judisthir, (Shakespear's Hindoo Dictionary, page 149, of the year 1817,) whom Kishn or Bishn protected; now Krishna, the Apollo of the Hindoos, appears from page 599 to have lived, according to Colonel Wilford, about 1300 years before Christ.

It is said to be the staff, with which he ground his bhang, and that the *bundi* or vessel in which the bhang was ground, was thrown into the Jumna on our taking possession of the fort. It is reported that this pillar was formerly standing near to its present position inthe circular ring facing the gateway on the inside of this fort, and that it was taken down on the Fort undergoing alterations, which appears to have occurred in the 44th year of the reign of Shah Aulum, when the plan of the fort is stated to have been altered by the English; [see page 34 of Shakespear's Hindustani Selections from the *Khelásat-ul-tawarikh*, or Abridgment of History;] Shah Aulum the second, came to the throne in A. D. 1761 (Hamilton's India, volume I. p. 410) so that by adding 43 years we shall bring the date of the transfer up to 1804, which was then the period of alteration of the Fort, and as is reported, of pulling down the pillar, but I have lately heard that this took place in 1798 or 99.

The capital of the column (shewn in the accompanying drawings) appears to have formerly borne a four-footed animal sitting upon it, and the slight traces remaining have the appearance of the Bull which is generally attendant upon Mahadeva. The animal must have been evidently "couchant," for the remains of the body as well as of the legs are connected to the stone itself.

The capital has a circular hole in it, probably to allow of the entrance of a point bar for fixing it on the top of the shaft, in the centre of which a similar hole is cut for that purpose.

The base of the shaft has a couple of projections similar to the trunnions of a piece of ordnance, intended probably as a place of fixture for the ropes which might be used in erecting it, or otherwise as a hold when built into its bed of masonry.

Taking the specific gravity of the block at less than that of marble and hard stone, 2.650, the weight of it will be found on calculation to be about 17 tons, 12 cwt. or 493 *mans*.

It is to be regretted that so handsome a column should be allowed to lie as it now does "unnoticed and unknown," when the outlay of about two thousand rupees would place it upon a neat pedestal in a more appropriate position, as it is represented to have stood formerly in the sketch in the Asiatic Researches. The pedestal should of course be constructed entirely after the native method of architecture, and have nothing Eu-

ropean at all in its composition, unless an incongruous effect were the desideratum of architectural beauty*.

My brother of the 64th regiment, was kind enough (for it was a work of labor) to make a copy of so much of the various characters as is situated on the present upper surface of the stone (or *gadá* as it is named by the natives). Lieut. Burt having to rejoin his corps before the stone could be removed, I have employed a moonshee in effecting a copy of the part which remained under ground, for the stone was buried about a foot in the soil, partly from the effect of its weight, and partly from the pathway having been added to from time to time with road material. I have examined each of the copies (with the stone?), and corrected the shapes of those letters which appeared to require it both in the first copy and in its transcript.

The Persian inscription is so far peculiar, that in reading it upon the stone, the lower, or second line, is to be read first, so as to preserve the gradation of the nine Emperors of Delhi mentioned in it, Timu'r being the first, and Jehangír the last, in whose time it would seem to have been engraved. The year mentioned is 1014 (see compartment 2 from the left, vol. VII. page 180, Asiatic Researches), which appears on reference to Mr. Smith's Chronological Table, at page 447 of the same volume, to have been the year in which Jehangír was crowned at Agra.

I do not send an exact copy of the ornament surrounding the Persian inscription, as that shewn in the volume referred to is so much more neatly done than any I could obtain that I beg to refer you to it: only one or two of the Persian letters differ from the copy now sent; they are in alto relievo, beautifully cut, and still appear as if newly executed upon the pillar.

The Persian letters being in alto relievo upon the central band of the stone, induced me to think that they must have been cut or left upon it on its first removal from the quarry, or in A. H. 1014 (A. D. 1605), as above noticed; but subsequent inspections induced me to think differently, for although the letters themselves are in alto relievo, or projecting far beyond the belt or zone upon which they rest, yet the plane of that belt or zone is excavated so deeply in the periphery of the stone that its depth is exactly equal to the height of the letters themselves, which shews without contradiction that the Persian inscription could have been engraved subsequently to the writing in the Sanscrit character, every letter of which is cut into the stone, and consequently has no projection whatever, excepting what the surface of the periphery pre-

* Major Irvine, Engineers, C. B. states that in 1826, he sent in an estimate to put it up for about 1800 rupees, but the Governor General, Lord Amherst, objected to the expence on the grounds of its inutility!

sents at the interstices of the letters, whereas; if the sunken zone did not exist upon which the Persian characters stand prominently forth, and if the letters stood out beyond the general surface of the column itself, it might be reasonably assumed that the projecting Persian characters were coeval with the extraction of the stone from the quarry, or at least with the date of its receiving the final smoothing and polishing from its rough hewn state.

Measuring with a string I have perceived that the writer's name in Persian, ABDULLAH, in alto relievo in a separate compartment is likewise situated below the general surface of the stone: moreover, that it has been cut out at a part where the ancient inscription No. 2 had evidently peeled off before the Persian was written. This establishes the prior existence of the engravings Nos. 1 and 2, of which however, and without this proof, there could be no doubt. The same remark applies to the whole of the Persian inscription.

The Persian inscription runs thus, in the original, and rendered into Roman characters; each compartment of letters being read first from the lower line, as before explained.

الله اکبر * نورالدین محمد جهانگیر بادشاه غازي * یاحافظ * ابن اکبر
بادشاه غازی * یاحفیظ * ابن همایون بادشاه غازی * یاحی * ابن بابر
بادشاه غازی * یاقیوم ابن عمرشیخ میرزا * یامقتدر * ابن سلطان
ابوسعید یانور * ابن سلطان محمد میرزا * یاهادی * ابن میر
انشاه * یابدیع ابن امیرتیمور صاحب قران * یاقادر * احدالهي
شهریورماه * موافق ربیع الثاني ۱۰۱۴

Allah Akbar—Nooruddin Muhammed Jehangir Badshah Gházi—ya háfiz—Ibn Akbar Badshah Gházi—ya hafeez—Ibn Humáyun Badshah Gházi—ya hay—Ibn Bábar Badshah Gházi—ya kayum—Ibn Umar Shaikh Mirza—ya Muktadir—Ibn Sultan Abu Said—ya nur—Ibn Sultan Muhammed Mirza—ya hadi—Ibn Miran Shah—ya badia—Amir Timur Sahib-kiran—ya kadir—ahad illahi, sahr—yur mah muafik rabiussani, 1014 *(A. H.)*

Translation.

(God is great !)—The light of the religion of Muhammed, the Emperor JEHANGIR, victorious over infidels;—(Oh! Preserver)—son of the Emperor AKBER, conqueror of infidels;—(Oh! Protector)—son of the Emperor HUMAYUN, victorious over infidels;—(Oh! Giver of Life)—son of the Emperor BABER, victorious, &c.;—(Oh! Eternal)—son of UMAR SHAIKH MIRZA;—(Oh! Almighty)—son of Sultan ABU SEID;—(Oh! Light)—son of Sultan MUHAMMED MIRZA;—(Oh! Guide)—son of MIRANSHAH;—(Oh! Wonderful)—son of Amir TIMUR, Lord of happy destiny;—(Oh! Omnipotent)—In the month *shahr yur*, in the 1st *Iláhí*, corresponding with *Rabiussáni* A. H. 1014*.

* The *Iláhí* year should be 49, for the æra of AKBER commenced with his reign, in the 5th *Rabi-ussáni* 963 (= 1 March, 1605); therefore the word احد must be a

With respect to the specimen of the inscription on the pillar at Allahabad (shewn at page 180, volume VII. As. Res.) I beg to say that, that part which originally, or when it was copied in June 1797, was adjacent to the Persian writer's name "ABDULLAH," no longer exists, and has evidently peeled off; some of the letters I can find to agree, both of the stone and the specimen, but only a few, as most of the others are manifestly incorrect, as may be seen by comparing the specimen with the full copy now sent; the former should therefore be only looked upon as a partly correct and partly incorrect specimen of the character chosen here and there, and not as an exact copy of any part of the inscription; indeed, the line in this character which is situated above the Persian in Captain HOARE's specimen, does not now appear upon the column at all.

The inscription No. 1, (which is evidently of the same character with that upon the *lat,h* at Delhi,) is in many parts illegible, chiefly because the outer surface of the stone has peeled off to the depth of one-eighth or one-fifth of an inch from those parts, caused probably in the first instance by the effect of the hammer and chisel, or other instrument used in engraving the inscription, so as to have either cracked or loosened the general surface to the depth of the letters cut; which surface, although not at the time apparently injured, might have become, in suffering frequent alternations of heat, cold and damp, so loose in some parts, as at last to peel and fall off in flakes.

The natives state, some that the unknown character is Marhatta, others that it is Punjábi, and that although no one at this place can now read it, a traveller from Bombay took a copy of it some years ago, and said that he could read and decipher the character; I requested my brother to make inquiries at Benares, and I have also written to Cawnpur, near to which the Mahratta Prince BAJEE RAO is stationed, with a hope of procuring information, but without effect.

The size of the letters of the ancient Sanscrit character No. 2, was about an inch in height and an inch more or less in breadth, and of the unknown character No. 1, nearly the same.

One part of the unknown character No. 1 similar in every respect to to that on the Delhi *lat,h*, is situated above the Persian writing on the left hand side of the drawing No. 1. and consists of but a small portion of the different letters engraven on the stone.

wrong reading for ۶۹. *Shahryur* is the 6th month, and falls in August. The Hijri also, *Rabi-ussáni* 1014, corresponds with the same month. AKBER died on the 13th of *Rabi-us sáni* 1014, (= 21 August, 1605;) he inscription therefore must have been cut within a few days of this event;—the coronation of JEHANGIR did not take place till *Jamádi* 2, or two months later.—ED.

Sir C. MALET, at page 384, vol. vi. As. Res. speaks of Hindoo symbols in Bombay, does he thereby refer to the characters of the inscription? It is not impossible indeed that they may be of a numerical or astronomical character, as hidden to our knowledge as are the Egyptian hieroglyphics, for the square, triangle, circle, mercury, are to be frequently met with in the character No. 1.

My brother in passing Benares sent a specimen of the character No. 1, to the secretary of the Hindoo College there; but that officer was unable to give any assistance in deciphering it. Lieut. B. from Benares says, "I have made every inquiry regarding the inscription, No. 1, on the pillar, a specimen of which I took with me from Allahabad; but neither the head pundit of the Pátsála here, nor any others to whom I have shewn it, are able to decipher it, or to tell me of what character it is composed."

It is very evident that the inscription, No. 1. is of exactly the same kind as that shewn in Plates X. XI. XII. XIII. and XIV. of the 7th volume As. Res. p. 180, as existing on the Delhi pillar, the translation of which will not I trust be considered as hopeless; but of No. 2, to which the Gya inscription is so near an approximation, Dr. MILL, Mr. CSOMA DE KÖRÖS, or any other Sanscrit scholar, will most probably be kind enough to supply the translation.

The Devanagari character, No. 3, has been also copied and is sent herewith, but it is by no means so neatly engraven on the stone as the other characters, nor is it in many places at all legible, although as an assistance in the operation we threw common red soorkee or brick-dust into the hollows which compose the letters, and then wiped off the particles that rested on the projections, between them, with a wet or rather a damp piece of cloth, which rendered the letters more distinctly visible.

This third inscription, No. 3, occupies the greatest part of the surface of the stone, and lies above the Persian. It is supposed to have been written by various persons, who in paying visits to the pillar from distant countries, left impressions of their names and actions upon the face of it. This is the native idea on the subject, but the point may be set to rest upon the character being translated. I have not made much inquiry about the legibility of the last mentioned character, as the native account took away from the interest that it would have otherwise occasioned: the letters are badly cut, and in many places almost illegible. This character, No. 3, contains some dates which I have marked: one of the year Samvat 1562, which as this is 1890 of the same era of Vikramajít, must have been written 328 years since; another of Samvat 1663, or 327 years; another 1515, or 368 years; another Samvat 1639, 261 years; another

1640, or 250 years; another 1762, or 128 years; another 1863, or 27 years; another Samvat 1638, or 252 years since.

On examining all the 18 volumes of the As. Res. I am happy to say I have found, or at least partly found a key to the character No. 2, in the transcript and interpretation of an ancient inscription at Gya, by Dr. Wilkins, vol. I. page 279. This will evidently serve as a guide, by which nearly half of the letters can be made out, as is evident on inspection; and it may therefore be assumed as likely that Dr. Wilkins at home, or any Sanscrit scholar in this country, has in his possession means of reading and translating the whole of this at present unknown inscription, No. 2; which from what the Doctor says as applied to the Gya inscription will probably prove to be composed of fine Sanscrit, and to be more than 1800 years old. It may indeed have a still greater age, because some of the letters of the character No. 2 appear of a more illegible nature than those of the Gya sculpture, although manifestly of the same description. It must therefore have been engraven upon the column long before the two Persian lines before spoken of, which bear a date no farther back than 228 years, or A. H. 1014.

In the description of the Ellora Caves, in the 6th volume As. Res. no specimens of the inscription are given, but on reference to the fac similes of some of these in the 5th volume, I find that a few letters correspond with No. 2.

There is also I think a resemblance to the character No. 2, on a pillar at Buddal, which has been translated by Dr. Wilkins in the 1st volume As. Res. page 131, and a still greater similarity strikes me in the Monghir inscription, also translated by the same learned scholar in that volume.

I have thought it necessary to send a copy of part of the Gya inscription, which has been translated, together with the modern character written beneath it, as given by Dr. Wilkins in page 178, in order that it may be compared with the inscription No. 2, of this pillar. It seems to me to be exactly the same character, but perhaps less antique. Mr. Harington says, the pundits at Benares could not read the Gya inscription, but Dr. Wilkins *has* read it. Mr. Harington observes, that another inscription of one line only exists there, of a different character, and unintelligible. Perhaps this may be similar to No. 1, and it would be interesting to ascertain the fact through the aid of some of the correspondents of the Journal. Query. Has it any connection with the Greek character, to which No. 1 bears some similitude, in the Greek letters λνσϵΔΓF some of which are mentioned by Mr. Stirling, at page 312, As. Res. volume XV. viz. the " ou, sigma, lambdu, chi, delta, epsilon, and

a something closely resembling a figure of the digamma*." The *Khandgír* inscription appears to resemble the Allahabad character exactly in my opinion.

Dr. W. says of this inscription No. 2, "The character is undoubtedly the most ancient of any that have hitherto come under my inspection;—it is not only dissimilar to that which is now in use, but even very materially different from that we find in inscriptions of eighteen hundred years ago; but though the writing be not modern, the language is pure Sanscrit, written in a long verse called *Sardoola vikririta*, and consists of four pauses of nineteen syllables each, in this form,"—(which the Doctor gives)—they appear to be feet consisting of a molassas, a pyrrhic, a trochee, a tribrach, a molassas, a bacchias, and an iambus. The Doctor states that the metre was no small help in deciphering the words, and this will probably be found to be the case in the Allahabad inscription, as the letters composing the character, are chiefly equidistant from one another, without the appearance of stops. I have strong reason for thinking No. 2 to be verse, because several lines end with the same letter, which appears indicative of rhyme. It is probably of a mythological character. See also p. 357, recording the translation of a partly similar inscription found at the fort of Tanna.

The character at page 500 of this volume (xv. As. Res.) is not far different from the one line of inscription, No. 5, copied, as it appears, on the stone, viz. at right angles to the rest of the character, for both bear a peculiarly square appearance. See Alphabet of the same at p. 506, furnished by Mr. H. H. WILSON, from which this also may perhaps be deciphered†.

In the As. Res. vol. vi. page 447, Captain JOHN MACKENZIE sends a copy of the inscription found by him at Ceylon on a block of stone much corroded by time, but which he made out by tracing chunam, or lime water on the hollow characters indented in the rock, which rendered them legible on the dark ground of the stone. I think it would be a better plan in a similar case to pass a cloth or brush damped in lime-water, rapidly over the general surface of the stone, for when the lime dries white, every dark letter will appear distinctly contrasted with the white surface, because the letters themselves are not to be wetted, but only their projecting interstices.

The Ceylon inscription is probably old Sanscrit also, as it resembles No. 2 in some of the letters.

* See note at the end of this paper.—ED.

† See Plate vi. at the right hand near the bottom.

Inscription on the Allahabad Pillar. *No. I.*

The Persian inscription comes here, obliterating 3 lines.

The parts dotted are obliterated

taken in 1833
at Allahabad
by Lieut.^t J.S. Burt. Eng.^rs

Copied by J.P.

Classification of the ancient character, No. 1.

Reference	Simple letter	united with the vowel marks. á?	é?	í?	ó?	ú?	with ň	Other forms occurring
1	32	3	11	3	2	1		
2	30	12	12	15	1	2		
3	2	2	12	5	1	2		written by Lt. Burt
4	30	11	4	6	4	1		(nº 2 with r?)
5	26	12	12	10	2	1		4
6	1	1	2	2	?	1		
7	27	6	19	3	?	1		
8	29	8	8	17		4		
9	17	8	7	22	3	2		
10	20	6	10	4		3		(in Burt)
11	21	7	4	4		1		
12	24	1	1	1				
13	17	2	1	2		2		
14	20					?9		? (the rest effaced?)
15	11	6	2	7	2	2		
16	4	2	1	2	1	1		
17	9	?4		7	2	1		
18	5	2	4					
19	6	1	?					
20	5	6						
21	3							same as 2?
22	2							doubtful
23	?							
24								
25	4	3		1	1			half size
26				1				ditto
27	2					?		ditto
28	1	3		2				do
29								
30	Compound of + & ?							

The Initial word of 2 inscriptions on this &

5 on the Delhi Column. As. Res. VII. 180.

¶ The figures against each sign shew its frequency of occurrence on the Stone

J.P. del.

J.B. Tassin lith.

In the inscription at Mahabalipuram*, As. Res. volume v. p. 75 to 80, a very few letters correspond with those in No. 2. Captain Wilford, p. 135, says he was shewn a Sanscrit book containing many ancient alphabets, qr. at Benares?

Captain Colin McKenzie states that there are unknown inscriptions on the pagoda at Perweettun, page 314, volume iii. Page 167, et seq. contain two translations, by Dr. Wilkins, of inscriptions from the Vindhya Mountains, but no specimens. Page 383 of ditto, is an inscription in the Malaga language engraven upon a silver plate, which was found in a cave near Islamabad by John Shore, Esq. (now Lord Teignmouth) but no specimen appears, which is to be regretted.

Volume iii. page 39. contains a specimen and translation, by Sir William Jones, of a Sanscrit inscription from the Carnatic, not much like No. 2.

Mr. Colebrooke says at page 401, that Mr. Wilkins ascertained the date and scope of a Sanscrit inscription at Cintra in Portugal: see page 422, also, where the Canara language is stated to be mixed with Sanscrit in an inscription found in the Upper-Carnatic, some of the stanzas being supposed to be Pracrit; also that the junction of the three languages, Telinga, Mahratta and Canara, takes place some where about Beder. It is strange that a few of the natives here should say that No. 1, is Mahratta, and some that it must be Carnatic writing.

Page 224. "The ancient Canara has gone so much into disuse, that it was with difficulty I could get people to read it. An Alphabet will be yet communicated, as several books and ancient inscriptions are written in this character." Page 398 et seq.

The No. for August, 1833, of the As. Soc. Journal, shews in pages 387 et seq., several characters of the Kah Gyur similar to No. 2; see also vol. i. Journal Asiatic Society, page 276, where some Tibetan characters assimilate with it.

I have thus endeavoured to afford as much information as was in my power on the subject of the Allahabad pillar and inscription, and wish it could have been more satisfactory or ample; but I trust my endeavours will be considered in a favourable light, should the opinions I have expressed differ from those of others who must be so much better acquainted with the subject than I am.

A specimen of the stone accompanies.

* See note by Capt. Troyer: the Mahabalipur inscription is in the same character nearly as No. 2, and was of great use in deciphering it.—Ed.

II.—*Note on Inscription No.* 1 *of the Allahabad Column. By* James Prinsep, *Sec. &c.*

When I requested the author of the preceding description to undertake the task, which he has so faithfully and carefully executed, I had but little anticipation of the valuable historical information that would reward the labour of transcribing the almost illegible inscriptions covering the surface of the Allahabad *lath*. Aware indeed that the only accurate data we possessed for adjusting the chronology of Indian princes were those derived from ancient monuments of stone; inscriptions on rocks and caves; or grants of land engraven on copper-plates, discovered accidentally in various parts of the country;—I could not see the highly curious column lying at Allahabad, falling to rapid decay, without wishing to preserve a complete copy of its several inscriptions: for the specimen of them, published in the seventh volume of the Researches, comprised but two or three lines; and was professedly intended to give only an idea of the different characters of the three (or, with the Persian, four) inscriptions. It is indeed greatly to be regretted that the task was not accomplished twenty or thirty years ago; for the ravages of time, or rather climate, have probably in that short period committed greater injuries on its surface, than during an equal number of centuries antecedent:—"The line in the printed specimen, near the Persian name Abdullah, is no longer to be seen on the stone," says Lieut. BURT. The horizontal position of the pillar allows the rain to settle in the cavities of the letters, and soak into the stone itself, and this action alternating with the fierce heat to which it is exposed from the sun's rays, has caused the outer surface of the stone to split and peel off in many places. Lying half buried in the ground also, the saltpetre, or other salt with which the soil is impregnated, must have had its share in the ruin of the prostrate monument. Many of the sandstone buildings in Benares, and indeed all over the country, exhibit the influence of this destructive agent; at the height of a few feet from the ground their surface is seen to peel off in thin flakes*, while the higher parts remain sharp and uninjured for ages. The Moghul emperor JEHANGIR was contented to engrave his name and proud descent in a belt through the middle of the most ancient inscription;—the English would rightly deprecate such profanation, but their own passive neglect has proved in a few short years even more destructive than the barbarous act of the Muhammedan despot.

* The effect may be produced by the crystallization of the deliquescent salt lodged on the stone at that height, and marked by a zone of damp; the heat of the day would evaporate the moisture, and cause the salt to crystallize, which would split the stone just as the freezing of water in cold climates produces the same injury to buildings.

We have however before us what remains at this time of its interesting contents, and must hasten to make them known for the satisfaction of the antiquarian and the Sanscrit scholar. There are, as Lieut. BURT has fully described, three principal types of inscription, exclusive of the modern Persian sculpture.

The two first and most important I have carefully reduced from the facsimiles presented to the Asiatic Society, so as to suit the pages of the Journal.—The third, No. 3 of Lieut. BURT, consists merely of detached names and dates in modern Nagari, Bhaka, Marhatta, &c., and though the longest, is the least interesting, and is not worth the trouble of transcribing. A few of the dates are enumerated in the foregoing account.

No. 2, as pointed out by Lieut. BURT, is identical in character with the Gya inscription decyphered by Dr. WILKINS. It was made over at the meeting of the Society to Captain TROYER, Secretary of the Sanscrit College, who has been fortunate enough, with the aid of MADHAVA RAY PANDIT, the librarian, to decypher many parts of it: and their examination has developed the names of several princes, and particularly of CHANDRAGUPTA, perhaps the one most earnestly desired by the Indian antiquarian, because of its connection with an epoch in the historics of the western world. Dr. WILKINS had imagined the Gya character to be as ancient as the Christian era, which will be confirmed, if the CHANDRAGUPTA spoken of be the same of whom ARRIAN speaks. Some doubt may again arise from the discovery of his name on a monument at Allahabad, with regard to the position of his capital, a point that has only lately been considered to be set at rest by the identification of Palibothra with *Pataliputra* or Patna. The name of SAMUDRAGUPTA as a fourth descendant of CHANDRAGUPTA is not found in the Hindu catalogues of the MAURYA dynasty, although there can be no doubt of the reading on the column. I have extracted the name and titles of CHANDRAGUPTA, and placed them in the plate under the alphabetical key, to shew that it has been faithfully rendered by the pandit.

One other Raja of the same name occurs among the Ajmeer or Rajputana princes in the seventh century, but here also the descendants are of different appellations. The only argument which occurs to me as favoring the latter date, is the great similarity between the Sanscrit character of the inscription and the Tibetan, (noticed also by Lieutenant BURT): the alphabet of which, according to Mr. CSOMA DE KOROS, was adopted from the Sanscrit in the seventh century. Many letters are indeed identical and of the same phonic value, as will be evident on comparing the following with the alphabet in plate VI :—

kh, g, ch, ch, j, t, d, n, p, ph, b, v, h, y, l, sh: also the whole of the vowel marks *i, u, é, o:* the sub-

joined letters *r* and *y;* as, ད *dra* and ཕྱ *pya,* and the *vazur* or subjoined *w* or *v,* as ཌྭ *dv* or *do.*

Other similarities might be pointed out, but these are the most striking: the mode of expressing the long *á* also at that period, by a short dash at the top of the letter, may explain the omission of this character in the Tibetan alphabet. Captain TROYER notices the omission of many letters* *(gh, jh, &c.,)* which are equally wanting in the Tibetan alphabet. However, the identity here noticed does not necessarily detract from the antiquity of the inscription, or prevent its applying to the earlier CHADRAGUPTA; since the same character was probably in use for many centuries. When or where it gave place to the more modern Nagari would be a curious and interesting subject of investigation.

However ancient the inscription No. 2 may be, it is very certain that the character No. 1 boasts a still higher antiquity. This may I think be proved—first, by the position it occupies on the Allahabad column, as well as on that of Delhi, called *Feroz's lath:* in both it is the principal, and as it were the original inscription, the others being subsequently added, perhaps on some occasions of triumph or visit to the spot. Secondly, the simplicity of this character and the limited number of radicals, denote its priority to the more complicated and refined system afterwards adopted; while thirdly, the very great rarity of its occurrence on ancient monuments, and the perfect ignorance which prevails regarding its origin in the earliest Persian historians, who mention the lath of FEROZ SHAH, confirm its belonging to an epoch beyond the reach of native research. The only other inscriptions identical in character which have been met with in India, are I believe that of the lath of BHIM SEN in Sarun†, and that of the Khandgiri rocks in Orissa, of which a facsimile is given by Mr. STIRLING in the Researches, vol. xv. page 314. The Ellora and other cave inscriptions appear to be considerably modified from it, and in fact more to resemble No. 2 of the Allahabad column; and the latter inscription has so many points of resemblance, that it may be fairly traced to a derivation from the former.

It is not yet ascertained, whether the language this character, No. 1, expresses is Sanscrit. The rare occurrence of double letters, the omission of the initial *Sri;* the want of any symbol with a subjoined *y* to correspond with स्य, the inflexion of the possessive case which occurs so repeatedly, and is so distinct, in the Sanscrit text No. 2; are arguments against the supposition: but the similarity of the character and of the vowel marks are as much in its favor.

* See page 118.

† Has any copy of this inscription been published? Mr. STIRLING mentions it, but I do not find it in the Researches.

Mr. Stirling has suggested as a remarkable circumstance that many letters of the No. 1 type resemble Greek characters, and he instances the "ou, sigma, lambda, chi, delta, epsilon, and a something closely resembling the figure of the digamma." This resemblance is, however, entirely accidental, and the genus of the alphabet can I think be satisfactorily shewn to have no connection whatever with the Greek. To enable us to determine this point, I have taken the trouble of analyzing carefully the whole of the inscription from Lieut. Burt's manuscript, classifying those forms which seemed to be derived from the same radix.

Proceeding in this manner I soon perceived that each radical letter was subject to five principal inflections, the same in all, corresponding in their nature and application with the five vowel marks of the ancient Sanscrit No. 2. This circumstance alone would be sufficient to prove that the alphabet is of the Sanscrit family, whatever the language may be. In the accompanying plate (Pl. V.) I have arranged the letters and their inflections so as to exhibit every form which occurs on the column, placing numbers against each, expressive of the frequency of its occurrence. From a cursory inspection of this plate it will immediately be seen that the supposed *sigma* is but the first inflection of the 13th letter: the *epsilon* and *digamma*, are the same inflections of the 18th and 11th characters: while the *ou* and *lambda* (1 and ɾ) are themselves subject to all the inflections like the rest, and are consequently primitive or simple letters, of a system quite different from the Greek.

The number of alphabetical symbols is small, compared with those of modern systems founded on the Sanscrit: of the thirty, several have not been found subject to inflection; these may be initial vowels. The circle, square, and triangle are of a smaller size in general than the rest, and may be affixes: but of this and of the powers of the letters, I cannot pretend to offer any conjectures at the present moment. Many of the literal forms undoubtedly bear a close resemblance to those of No. 2, and to those of the Mahabalipur alphabet, decyphered by Dr. Babington; and one might almost be tempted to point out successively the *s, d, dr, v, b, ch, j, g, t, l,* from their analogy to the known letters in the foregoing scheme. It is better however to say nothing on this head, until we are prepared to apply the scheme to the unravelling of a portion of the legend. For this purpose, one word offers a very convenient test: it is the initial word of both parts of the Allahabad inscription (see pl. V.);—of all the four inscriptions on the Delhi column; and it also occurs a second time on the east side. I have inserted it at the foot of Plate VI. It will probably be found to be some term of invocation, though essentially different from the *Sri* of the Hindus.

As one mode of aiding the investigation of the powers of the unknown alphabet, supposing the language expressed to be Sanscrit, I had the letters in a page of the *Bhatti Kávya* classified and counted, to compare with the enumeration in Plate VI. They were as follows :

त	93 times	म	33 times	व	9 times	भ्	3 times	ट	0 times
य	57	प	30	ट्	9	ई	3	ङ	0
न	51	श्र	25	ह	6	ए	2	ठ	0
र्	51	ल्ल	22	ङ	6	ञ्च	2	ड	0
क	45	थ	15	घ	5	ख	1	झ	0
स	44	च्च	14	ध	9	फ	1	ढ	0
द्	43	ग	12	ण	5	उ	1	ञ	0
व	41	ष	11	ज	3	च्च	1		

I also made the same classification of one page of the *Feroz lath* inscription, which I found to agree pretty well with the table prepared from that of Allahabad. There is one marked difference, which may be due perhaps to the copyist :—I allude to the separation of the words in the former, which does not appear to be the case in Lieut. BURT's transcript.

It would require an accurate acquaintance with many of the learned languages of the East, as well as perfect leisure and abstraction from other pursuits, to engage upon the recovery of this lost language ; but when its simplicity of vocables is compared with the difficulties of the Persepolitan, or cuneiform character, lately decyphered by GROTEFEND and St. MARTIN, or the more abstruse hieroglyphics of Egypt attempted by YOUNG and CHAMPOLLION, it seems almost a stigma on the learned of our own country that this should have remained so long an enigma to scholars ; and the object of the present notice is to invite fresh attention to the subject, lest the indefatigable students of Bonn or Berlin should run away with the honor of first making it known to the learned world.

III.—*Remarks upon the second Inscription of the Allahabad Pillar. By Captain* A. Troyer, *A. D. C. Sec. Sanscrit College, &c.*

[Read at the Meeting of the 20th March.]

An alphabet of the inscription No. 2, copied from the Allahabad pillar, compared with the Deva-nagari, was compiled by MADHAVA RAO, the head Librarian of the Sanscrit College. It will be seen from the annexed copy of it, (Plate VI.) that eight of the consonants, namely, घ (g'h), ङ (j'h), ञ (n), ट (t'), ठ (t'h), ड (d'), ढ (d'h,) and three of the vowels ऋ ॠ ऊ (*i*, *í*, *ú*,) could not be found.

The alphabet of the Allahabad inscription offers certainly a great apparent similarity to that of a part of the Gya inscription, examined by Dr. Wilkins, [As. Res. vol. i. page 279,] as pointed out by Lieut. Burt, of the Engineers. It almost entirely coincides with that of some inscriptions on the rocks of Mahámalaipur, (vide Trans. of Royal As. Soc. vol. ii. part 1, Plates 13, 14.) Notwithstanding this similarity common to a great number of Indian alphabets, it is not yet easy to fix the value of each letter of an ancient writing, in such a manner as to preclude the possibility of a doubt.

It was principally the alphabet of the Mahámalaipur inscriptions that enabled Madhava Rao to transcribe in Devanagari characters, the remains of the inscription copied from the pillar at Allahabad. This consists of 30 lines. More than a moiety of the first 13 lines is entirely pealed off; the other 17 are fuller, but evidently more or less cut off at the right extremity, and all with many intervening chasms.

An even slight examination of the transcript made in Devanagari characters is sufficient to find a number of Sanscrit words, and the whole inscription may without hesitation be pronounced to be Sanscrit. In the accompanying paper, the translation of the Sanscrit words, which could without difficulty be found in each line, is given. Scarce any change has been made in the words of the transcript, except in a few instances, such a correction as is too often indispensable even in not inaccurate manuscripts. These few changes are marked above the lines.

As the frequent and wide disjunction of words, the terminations of which are mostly wanted, renders it impossible to fix the relative sense of each word, as well as to determine the general purport of the whole, any conjectural labour in changing vocables and supplying deficiencies would have been hopeless.

So much only appears indubitable from the words themselves, that they are encomiastic epithets of a Raja, the name of whom, if satisfactorily made out, might furnish an historical datum of no small importance.

Names are really found in the 17th, 18th, and 21st lines which seem insignificant; not so those in the 25th and 26th line, which happen to be more complete and connected than the others: thus we have in the twenty-fifth line;—"of the great-grandson of Sri Chandragupta, the great Raja, of the grandson of the great Raja Sri Yagnakacha, of the son of the great Raja, the first (supreme) Raja (Adhiraja) Sri Chandragupta:" and in the twenty-sixth line, "of the son of the daughter of Lich-ch'ha Vikriti of the family of Mahadivya Kumara—of the great Raja, the supreme Raja Sri Samudragupta, whose fame caused by the conquest

of the whole earth, increasing and expanding throughout the whole ground of the earth, was equalling TRIDASAPATI (INDRA)."

The name of CHANDRAGUPTA repeated here twice, as that of the great-grandfather, and that of the father of a Raja, cannot fail to excite attention.

According to the Hindee genealogies of the *Vishnupurana* and other books, CHANDRAGUPTA, a son, or at least a relative, of NANDA, founded a dynasty (called by his name, and also the *Maurya* dynasty, from his mother MURA), of 10 kings, who reigned during 137 years from the year 1598 to 1735 of the *Kaliyug*, (from 1504 to 1367 before our era,) in *Magadha*, the capital of which was *Palibothra*. It needs scarce be repeated that the Indian name CHANDRAGUPTA (the moon-protected) was found to be the same with SANDRA-COTTUS, or SANDROKUPTOS mentioned by the Greek historians. It is also known that from the similarity of these names, an identity of the persons of the contemporary of ALEXANDER and ally of SELEUCUS NICATOR, and of the before-mentioned founder of the Indian dynasty of that name was supposed, and that a whole system of Indian chronology was made dependent upon this supposition.

No disquisition upon this important and extensive subject will here be expected, so much less as the imperfect remains of the inscription here examined furnish no vestige of a date, nor any other data which may lead our conjectures towards, if not fix, a historical fact. It would be adventurous to assert that the CHANDRAGUPTA of line 25th, was the founder of the Maurya dynasty: all that appears in the inscription is, that a Raja SAMUDRAGUPTA (the sea-protected) was a descendant in the 4th generation of a CHANDRAGUPTA.

It is further to be remarked, that the name of the second CHANDRAGUPTA and that of SAMUDRAGUPTA are joined with the title *Adhirája*, supreme Raja, and not with that of *Chakravartti*, or emperor of the world, always assumed by the ruler of India. We may therefore infer that the Adhirájas of the inscription did not pretend to universal, although but titular, sovereignty; but may have been only counted among the many Rajas who at all times divided India among themselves. It was probably by their flatterers that the conquest of a few provinces was made the *conquest of the whole world*; in which expression, found entire among the ruins of so many others, nothing else but a monument of empty vanity was preserved.

Translation of Sanscrit Words of the Allahabad Inscription.

LINE I.

—— II.—1. minding sacrifice of the gods. 2. for the sake of a better state.

—— III.—3. counting the low. 4. knowing good qualities. 5. in heaven. .. 6 and 7. enjoying a poet's fame and a kingdom. .. .. ..

LINE IV.....8. with servants and family.....
—— V.....9. said by his son.....
—— VI.—10. in his actions of a never changing mind.....
—— VII.—11. Most valiant,..... whose foot approaching duly I salute.
—— VIII.—12. in the battle,.....with his own arm vanquishing always.
—— IX.—13. with high.. ..expanded—minds.....
—— X.
—— XI.
—— XII.—14. fame as seen by men (illumed) by the rays of the moon...
—— XIII.—15. active in the road, a poet's intellect and power proceeding. ..
—— XIV.—16. of Brahma....of the dextrous in hundred avatars—his own arm's mighty strength .....praised.
—— XV.—17. arrow.....18. family ....19. good name. .....
—— XVI..... 20. MAHENDRA'S worshipper..21. MAHENDRA'S mountain.
—— XVII.—22. NILARAJA to be known by words.. preserver of elephant's armor.. UGRASENA, DEVARASHTA. 23. from DHANANJAYA down all southern chartered kings taking. .. ..
—— XVIII.—24. VAMATILANA GADATTA CHANDRA VASU .. .. 25. all giving rent. .. ..
—— XIX. .. .. .. 26. by neighbouring kings. ..
—— XX.—27. destroyer of PRACHANDA SASANA (of a terrible commander).. 28. Destroyer of a kingly family,.. .. .. 29. whose fame is spread throughout all countries, son of a god.
—— XXI.—30. all .... .. governing his own humble faith. .. .. giver of one hundred thousand.
—— XXII.—31. ground of battle, ... fame of kings,.. .. .. 32. Of unpararelled faith, .. who by the strength of his own arm conquered more than one king.
—— XXIII.—33. Lord of the unfortunate.. .. 34. of him who was inaugurated the most eminent of poets.
—— XXIV.—35. sharp intellect, high understanding.. Gandharva—TRIDASAPATI (INDRA) .....36. By heavenly poetical works composed by learned men of him who was inaugurated the most eminent of Rajas .. 37. of a magnanimous conduct. .. ..
—— XXV.—38. of him whose mind is formed by time and action only in the palace of the world .. of the great-grandson of CHANDRAGUPTA, of the grandson of the great Raja SRI YAGNAKACHA, and of the son of the great Raja, the first (supreme) Raja (Adhiraja) SRI CHANDRAGUPTA.
—— XXVI.—39. of the son of the daughter of LICH-CH'HA VIKRITI, of the family of MAHADIVYA KUMARA .. .. of the great Raja, the supreme Raja (Adhiraja) SRI SAMUDRAGUPTA, whose fame caused by the conquest of the whole earth increased and expanded throughout the whole ground of the earth was equalling TRIDASAPATI, (INDRA.)
—— XXVII.—40. going to the house.. .. .. 41 gift by arm's strength, favor, weapons, words increase over and over, all-serving, jewel desiring fame
—— XXVIII.—41. PASUPATI (SIVA) purifying the three worlds. .. ..
—— XXIX. .....43. Of the son skilled in peace and war young prince. .. ..
—— XXX.—44. the supreme king .... 45. the chief of punishment (literally the chief of staffs, perhaps police-officer)' by TILABHADANTA.

Transcript of the Allahabad inscription, No. 3. in Deva-Nagari characters.

LINE

1 (the first line illegible.)

1 सु 2
2 मस्यक्र यगचेतसखमनसः शस्तरार्थम..ल..स्त..नि

3 4 स्व 5 व्व 6 7
3 व्यश्रीविक्तौ धान्त धगणित गुणज्ञउतनेचक्रत्व..वर्लोके स्य कवतकीर्त्ति राज्यं भुनक्तो

8
4 तुग्रपुग भवपशनैनक्त..नरैमभिः सभ्येसि सभृत्यकुस्तजमननवा

9
5 स्तउव्य..तेन..ध..गउणतत्विक्षिणवक्षसूयः पुत्रभिहितोनिधिकनिग्वि

10
6 स्वकम्मस्यनैकन्यमनसद्द..शन्यद्भुतोद्भिन्तउर्सभवैरास्तदधम....

11 11
7 वीर्य्यत्तम शिकच श्चरणम पगत यस्यवृत्तेप्रणमेपरि....

12 12
8 संग्रामेसस्वभुजविजितनित्यममबामकराः..श्वश्वोमानप्र....

13 13
9 तो....तुङ्गैःस्फर..रारसस्तउफलैर्मनोभिः पुश्यपुव..

10 रेद्वेलोदत..रुविर्यर..सुदेकेनायिन ..... ननगिसुध

11 ग्राउयगैचकौतुकुलज ..... यक्तेहपाद

14
12 ध द्रचोर न्तःशशिकिरण चयः कीर्त्तयसुप्रतंनरर्दृश्यते कहप्रगम्य

15 15 15
13 सक्तमार्गःकविमतिविभवोत्सरणं चपुकव्यकोनस्य .... नम्य

16 16 16
14 वेधसःपर शतावतरणदक्षस्य स्वभुजबलपराक्रमर..न्ध.. प्रससितोमर

17 18 19
15 भस्यपु नाराच वोतस्ति कव्या नक प्रहरण विज....कुल....त....शुभनाम
दायपटितकन्ततरव .. यकवि .. वमुक्तक

20 21
16 क्क..सरक..महेन्द्रमहकन्तारक..व्या..राजक्क राजकम राज पराक महेन्द्र
गरिक..रकस्वमरत्तिरा..पत्तकरासनकसनग्रहजनितप्रत श्र हभाग्यस्य

22 22 22 23
17 नीलराजवाज्ञेय कहस्तिवर्म्मपालककोग्रसनदवराष्टककु..रकोस्थलपरक धनञ्जय

23
प्रभृति सर्वदक्षिण पट्टराजग्रहण.. ..तः परिचकीकतसर्व्व विकराजस्य

24
18 ..वामतिलनामदत्तचन्दव.. ग ..च्यतिन्तगनग नाच्युतनन्दि लवद्यद्यनकार्यवर्त्त

25
राजप्रस..द्वर..त्तप्ररोचमउरिकदिभिग्य सर्वकरदान ..करणप्रणमागमन

26
19 समत दवक कामजपनदालकतपुणंप्रत्यन्त न्टप्रतिभि.. लव.. नयन दयमाद्रक
र.. ससनक..क..कवि यहानसहिशकम..ण्डः .. सहजक .. भिश्य ..

Facsimile of Inscription No 2, on the Allahabad Column, in ancient Sanscrit.

1 . . . . . *rest obliterated*

2 *do*

3 *do*

4 *do*

5 *do*

6 *do*

7 *do*

8 *do*

9 *do*

10 *do*

11 *do*

12 *do*

13 *do*

14 *do*

15 *do*

16 *do*

17 *do*

all peeled off

Alphabet compared with modern.

		k			*t*			*kh*
		kh			*th*			*s*
		g			*d*			*h*
		gh			*dh*			*ksh*
		ñ			*n*			
		ch			*p*			*a*
		chh			*ph*			*á*
		j			*b*			*i*
		jh			*bh*			*í*
		ñ			*m*			*u*
		t			*y*			*ú*
		th			*r*			*a*
		ď			*l*			*e*
		ďh			*v*			*i*
		n			*sh*			*o*
								u

pa *sri* *sya* *to*

Name of Chandra gupta . line 25.

sri *mahárája dhi rája* *cha ndra gu pta*

Inscription No 5

the dots in some of the lines mark the number of letters obliterated

Reduced from Lt Burt's original by Jas Prinsep.

Lith. by J.B Tassin

LINE श 27 28
20.... परिणषितप्रचण्डशासनस्य.. कभू.. रा त्सुन्तराजवंशप्रति ण तनियो
टि 29
गंतयशसःदवपुत्र.. सुरधरणी न्तस्य.. पृथिव्यामप्रतिरथस्य

30
21 सर्व्व.. पवसिभिरात्मनिवादनक क्योदयनदानगहत्मद स्वविनयभक्तिशासन
चनद्दोय....वकनर्य प्रवन तिमात्र.. श्री.. मृधदुदयस्यनकम्पुवतौनक
30
शतसहस्रप्रदायिन

31 31
22 .. .शतलंकृतनकगुणग..स्तिभि..रणतलप्र..न्यनरपतिकीर्त्तिःस सलिदयंप्रल
32 42
हस्यहः पहस....स्यभक्त्यासमस्य स्यभुजवलविजितनकनरपतिवि.. ..
....वप्रत्य नित्यव्यप्र.. यक्कपहस्य

33
23 ..दीननथ.. रजनद्वरणसन्तदी.. भ्यपगनमग्नस्यविग्रहवतादाकनगहस्यधनद
34
णन्त.. कःप्रतिष्ठितकविराजश्रेष्ठस्य सचिर.. तच्यतनकदृतोदाश्चरितस्य

35 35 35
24 निशित विदा ग्रमतिक गांधर्व लहितो वीरीप्त त्रिदशपति गाह.. .. उनिरदा
26 मु
..द्विद्वज्जनंशेव्य नाककव्यक्तियभिः प्रतिष्ठितराजश्रेष्ठस्यसचिरा..तच्यतनकदृ
37
तोदारचरितस्य

38 38
25 .... समयक्तिय नविधान मात्रमानसस्य लोकधाम्नी..वस्य..महाराज श्रीगुप्त
ज्ञ
प्रपौत्रस्य महाराजश्रीय कचपात्रस्य..महाराजाधिराज श्रीचन्द्रगुप्त पुत्रस्य
39 च तनदौहित्रस्य ि 39
26 लिच्छविकृहित्रस्यमहादव्यकुमारदव्याम..न्तस्य महाराजाधिराज श्री समुद्रगुप्तस्य
सर्वपृथिवीविजय जनितोदयव्याप्त निखिलावनीतल कीर्त्तिमितस्त्रिदशपतिः

40 41
27 भवनगमनवप्तल..तसुखविचरणमाच..णः। वभुवोमा रययु तसम्भयस्य प्रदान
र्य्य ा
भुजविक्रम प्रशम शस्त्र वाक्योदय उपर्युपरिसर्वा यच्छित मनिकमार्गयशः

42 ि
28 पुनाति भुवनत्रयं पशुपतं . न्तभहतिरोधपरिमा.. मिवपुण्डगप्रच.. तवकाव्य
.. स.. वभंजनपादानुदासस्य..सध्मपुपरिस..णनग्र..हितमतिः

43
29 स्वट्ट..पुकिकस्यमहादण्डनायक.... वभूति.. पुत्रस्यसन्धिविग्रहिककुमारामा
त्यम..... कडरि..... स्यसर्वभूतहृतस्तखायस्य

44 45
30 सनह्मितच परमभट्टारक पदान तम दण्डनायकतिलभदंतेन।

[The figures in the interlineations point out the words (beneath them) translated in the foregoing page: the letters similarly situated are suggested corrections of the text.]

IV.—*Extracts from a Journal kept by Captain F. T. Grant, of the Manipúr Levy, during a Tour of Inspection on the Manipúr Frontier, along the course of the Ningthee River, &c. in January* 1832*.

Marching Stations and Distances.

Tuobal, 11 miles ; a depôt of grain.

Huerok, 8 miles; inhabitants came from Tiperah 100 years ago.

Muchi, 9 miles ; a Naga village on the most western range of Murung hills.

Kolbang, 12 miles ; hence three roads lead to the *Kuboo* valley. Violent hoar frost on the 15th January. Lieut. PEMBERTON has described this road from actual survey.

Kwatobee, 10 miles; good road. Supari nut and cocoa nut trees were planted here by the raja's grandfather.

Khondong, 5 miles ; very good road. The people of Kuboo escaped from the opposite side of the Ningthee.

Maylung nala, 9 miles; road passes through a forest of keoo, teak, saul, cotton, and other trees: innumerable and recent tracks of the wild elephant, tiger, rhinoceros, bear, boar, cattle, and deer of various descriptions. Six wild elephants came to the nala together to drink; they were of a very large size.

Numphookam nala, 7 miles, east of the first range of Angoching hills.

Num-sing-yeet, 8 miles; a nala east of the second range.

Source of the *Helaoo nala,* 13 miles ; road good : crossed the highest range of the Angoching hills.

Helaoo, 12 miles ; on the banks of the Ningthee.

The foregoing route across the Angoching hills, I consider equally good with those to Mulphoo and Sunayachil, and it might with very little trouble be made practicable for every description of cattle. Not having been travelled for many years, and never before by Europeans, it is at present impeded by large trees, which have fallen across it, and also by bamboos which unite from both sides in many places, at about

* The above journal was some time since placed in our hands by Mr. GEORGE SWINTON, late Chief Secretary to Government. The new facts which it communicates to the geography of Ava and Manipur, are, the journey along the bank of the Ningthee for a space of about 40 miles between two points already well known ; viz. Mulfoo, on the north, and Saway Chit, opposite to the Burmese post Gendah, on the south, which place is connected with Ava by Dr. RICHARDSON'S route, published in the second volume of the Journal, page 59. The navigation of the river between the same points is also new, and the return route through the Moflong nála, which connects the Kubboo valley with the banks of the Ningthee, finding its way through the Angoching hills, which form the eastern boundary of the valley, separating it from the Ningthee.—ED.

seven or eight feet high above it ; and through which my elephants were obliged to break a passage for themselves. It possesses an advantage over the before-mentioned routes in a more abundant supply of water. The whole of the hills throughout this route to the Ningthee are covered with a dense bamboo jungle, which grows to an immense size. In that part of the last day's march where the road runs along the bed of the Helaoo nala, there is a second road on the bank just above, which is at present so overgrown with forest and jungle as to be impracticable. Just opposite Helaoo, a large nala called the Moo, Num-moo, or Muwa, falls into the Ningthee, in the bed of which the Kubos tell me, gold is more abundant than in the latter : the Kubos also say that gold is found in the sands of all the small streams which join the Ningthee on its eastern side. The road from Tummoo direct to Helaoo joins this one at about two miles distance from the latter village : it is much shorter, but so very bad as to have obtained the name of the " Noong-chongbi Lumpee," (stone-leaping road:) loaded coolies can however manage to travel it. Some who left Tummoo, the day after I left Khondong, with grain, arrived the day before me at Helaoo, being only three days on the road.

Halted the 23rd, 24th, and 25th January. Visited the cultivation, which is extensive in proportion to the number of inhabitants. They are now busily employed in transplanting their cold-weather crop : they have two crops in the year, one in the rains, and one in the cold season ; the former is close to the hills, to which the annual inundation of the Ningthee does not extend : the latter in the valleys, (if I may so call them,) formed by the bends of the river, by which they are annually overflowed, leaving large jheels on its retiring, that at the present time of the year are sufficiently dried up to allow of their being cultivated. On the evening of the 25th, went to see the process of washing the sands of the Ningthee for gold: it occupied two men for about a quarter of an hour, and the quantity found was about a grain troy-weight.

The road from Helaoo to Mulphoo, about 36 miles, or four marches, runs along the valley of the Ningthee, and might also be made available for all military purposes : elephants have travelled the whole way from Manipur.

31st January. Sent my elephants and coolies round to meet me at Sunayachil, intending to proceed myself to that place by water, as no boats larger than canoes are procurable ; two of these fastened at about four feet apart by small timbers, and a bambu platform laid over the whole, form a raft sufficiently large to hold sixty men; on which I mean to proceed. A raft of this description would answer well to cross troops, were boats not procurable. The current of the Ningthee, at the

present season, is very slow, certainly not much more than a mile an hour.

1st February.—Kneesung, which I reached in five hours. A short distance below Mulphoo a small range of hills crosses the river, composed of a reddish sand, with layers of pebbles running across it: in the rains the river saps the bottom, and carries away portions of the whole face annually; the greater the portion of the hill thus carried off, the more abundant is the gold found at Chanda-sneek (ghat), a short distance below it. A number of Kubos were busily employed in washing for gold, when I passed the latter place. Gold is only found in the sand, where mixed with pebbles and gravel. For the number and names of villages passed this day, see the sketch.

2nd—Halted. Received a visit from the Burmese commandant of the stockade on the opposite side of the river; his object was to see the English Bo-meng, never having seen such a monster before! He was very inquisitive as to the object of Captains JENKINS and PEMBERTON's trip. I made him a few presents, with which, particularly a couple of bottles of brandy, he was delighted and took his leave. Another chief passed down during the day with two boats and about thirty followers; he had been called up to Sumjok in consequence of my visit to this quarter: there were piled in the boats a number of what I at first took to be muskets, but which I, with the assistance of my telescope, discovered to be nothing more than branches of trees and bamboos made to resemble them, the actual number of muskets being only three. My coming it appears has created considerable alarm, and given rise to the most exaggerated reports; amongst others that I intended to place Manipur thanas at the Noajeri hills: on my trip up to Mulphoo, I could hardly discover a soul on the opposite side of the river; they appear now however to have got over their alarm, and I am visited by persons from all the villages as I pass down. A dozen large boats, which were detained above Mulphoo for some days, until my intentions were ascertained, also passed down in full sail. A considerable traffic is carried on between the capital of Ava and the villages on the Ningthee up as far as the Sing-Phos; the latter giving grain in return for bunats, coral beads, &c. &c.

Whilst some of my people were in the village on the opposite side of the river, a woman was carried off from the centre of it by a tiger: the inhabitants say it is the fourth occurrence of the kind which has taken place within the last two months. The Kubos do not appear at all alarmed at the vicinity of these animals, as they say the instances are very rare of their attacking or destroying human beings; if however such once happens, it is almost certain to be continued, and the only al-

ternative is to quit the vicinity of the place where it occurs ; they do not attribute the recurrence to a relish for human flesh required from having once tasted it, but to the displeasure of the " Laee" (Deity) of the place ; they endeavour to deprecate his anger by offerings on the first occurrence, but on a second taking place, they conclude he is implacable, and take it as a warning to remove. The village in question is only waiting to collect in the crops now on the ground and flit.

3rd—Mung-ya, two and a half hours. Passed a small nala on the Burmese side of the river, called Khywook-ma-Kywoong, at the mouth of which a number of people were employed washing the sand for gold. Was visited during the day by nearly the whole of the inhabitants, men, women and children, of the village, on the opposite side of the river ; who came, as they said, to see the wonder ! an European. Much cannot be said in favour of the modesty of the Kubos. I saw both this day and yesterday numbers both of men and women bathing at not ten paces distant from each other, with not so much covering even as a fig leaf. Unmarried girls observe, I am told, some little decorum in dress ; married women, none !

4th—Helaoo five and a half hours. The current in one or two places somewhat more rapid than yesterday.—Passed three parties washing for gold, one at a place called Nan-yen-sneek on the Burmese side of the river, and two on the Manipur one, near Eng-da-baoong.

5th—Maloo, seven hours. Immediately below Helaoo the Ningthee is joined by a river of considerable size, called the Moo, Nummoo, or Muwa, coming directly from the east and Neojeri hills. Gold is said to be more abundant in it than in the Ningthee, in this neighbourhood ; but not equal to the quantity found in the more northern parts of the latter, in the Sing-Phos country. The Kubos say that gold is not sought for in the Ningthee itself, below Helaoo, but only in the different hill streams which fall into it on the eastern side. As usual, since I left Mulphoo, I was visited by numbers of the inhabitants from the different villages as I passed down : my communications with these people leave not a doubt on my mind but what they would be happy to change their masters: indeed many of them took opportunities of slily telling me so, and expressed disappointment at my not proceeding to the Neojeri hills to place thanas.

6th—Brought to at a small nala called Khywook-kan-khywoong, six hours, no village. The current generally very slow, in some places almost still. Passed but one village during the day, and that on the opposite side of the river ; it belongs to the knight of the " branches and bamboos," who passed down whilst I was at Knesung. At a short distance below this village is an extraordinary hill called Swe-

ba-leng, the residence of a Laee or Deity, and by the Kubos's account a most jealous one he is : on approaching it, my Kubo boatmen put on their dhoties, being previously literally naked! and warned my Manipurees against making use of improper or obscene language, or spitting in the river whilst passing the precincts of his godship's residence. The infringement of these warnings they assured them might be attended with the most serious consequences to the whole party, and many were the instances of ship or rather boat wreck which they adduced to prove it. They also requested the Manipurees to give over a game, at which they were amusing themselves, as continuing it would doubtless be offensive. The Manipurees, who are not a jot less superstitious than the Kubos, implicitly followed the advice given, and put on the most serious countenances ; indeed the greater part of them had previously heard the fame of Swe-ba-leng. The hill, on which are several small temples, rises abruptly from the bed of the river, forming a natural wall of about three hundred feet perpendicular height, and is of a yellowish sand formation, based on rocks of hard grey sandstone : it appears the sudden commencement of a range, differing from the other hills in its vicinity, being free of trees, with which the others are overgrown, and running in a succession of cones to the south-west, as far as the eye could reach. No continuance of any of a similar appearance to the south-east. The face of the hill turns the river suddenly from a southerly to a westerly direction, in which it does not continue for above two hundred or three hundred yards, when the hills cause it again suddenly to resume its former course. The river is here very narrow, and just previous to its resuming its course to the south, a tremendous block of rock juts nearly half across, which repels the stream backwards and causes in the rains a whirlpool, which the Kubos say may be heard roaring at some miles distance, and which they attribute to the pranks of the " Laee ;" not the sudden checks which the current meets. In the rains the navigation past this spot must be very dangerous to any but a Kubo acquainted with its localities ; at the present season, however, it is a perfect mill pond. Some lime kilns were in the neighbourhood, but whether the lime-stone is procured from the Swe-ba-leng hill, or where, no person in the boat could inform me. I did not land to examine them, they being on the Burmese side of the river. No visitors during to-day, which is owing no doubt to my having now entered Ningthee-Rakha's jurisdiction. The village just above Swe-ba-leng is called Tan-beng-goong ; the chief of it is evidently very anxious to appear formidable in my eyes : he had hastily run up a loose fence of bamboos, plantain trees, and such like along the river front of his village, which he no doubt thought I would take

for a strong stockade, he also made a tremendous hubbub with songs, trumpets, &c. whilst I was passing; the village is a good-sized one, containing about eighty houses.

Eleven hours more brought me to Sunayachil. At this season the current is very trifling. On the eastern side sand-banks extend for four hundred yards into the bed of the river, offering favourable points for the crossing of troops, which at this season of the year might be effected on rafts, were boats not procurable. Both sides of the Ningthee are overgrown with dense forests, except on the sides of villages: the high road from Gendah to the present capital of Sumpok runs to the east of the small range of hills, which skirts the Burmese bank of the Ningthee.

10th February—Embarked in my dingy, accompanied by two others, to return up the Ningthee to Yuwa, where it is joined by the Maglung. I was rather confined for room; indeed, regularly packed, being unable to move hands or feet after once being seated in the boat. Reached Wegadza in six hours, where my people ran up a covering, for me to pass the night, of branches and leaves: a precaution rendered necessary as a protection against the heavy dew which soaks through every thing exposed to it. The fogs which continue till 9 A. M. are also so heavy as to render indistinct, objects at fifteen or twenty paces distance.

11th—Reached Yuwa in three hours, being in all nine hours from Sunayachil; or only two hours more than it took the boat to go the same distance with the current. Two men were all that rowed the boat up. This will give an idea of the slackness of the stream. After proceeding up the Maglung for three hours, put to for the night. The Maglung discharges itself with some force into the Ningthee, and as before observed, a boat or raft coming out of it would be carried without any exertion nearly to the opposite side of the latter, in which there is no perceptible current. After once getting fairly into the Maglung, the current is moderate, and the waters shoal, not more than two feet in depth; its course during this day nearly from west to east. Put to for the night on the sand-bank and enjoyed a coal fire, of which mineral there was abundance lying about. The tracks of wild beasts of every description were numerous and recent in the sand.

12th—At day-light this morning, was roused by a loud but not very harmonious concert, the performers being elephants, tigers, bears, boars, and deer. About three hours after starting reached the site of a village named Yang-num, at which was formerly a Manipur thana; near the site of the thana is a peepul tree, planted, the Kubos say, by the Manipurees, another proof that Kubo belonged to them at a former period. I landed for the purpose of examin-

ing salt wells in this village : the springs are copious and in full play, sufficiently so to feed a small stream which flows from them into the Maglung ; the water in the centre of the well is nearly as salt as brine, and on the sides, where it has been exposed to the sun for any time, fully so : in the bed of the river, immediately opposite the village, are also salt springs, which rise in bubbles to the surface of the water. The village, though not inhabited for many years, is perfectly free of grass and jungle, the salt wells rendering it a favourite resort for wild animals. In two hours from the village, reached the site of the second Num-mo, where also are salt springs ; and in another hour, the junction of the Tadoi Khynong nala, where I put to for the night; from hence to where the road to Sunayachil crosses the Tadoi Khynong is five hours' journey. The current during the day generally very slow. Passed three rapids, each of about thirty yards continuance, but the fall so trifling as not to render it necessary to unload the boats: some of my people were generally walking and amusing themselves in searching for turtles' eggs, which are so abundant that the boat might have been almost loaded with them. In several places found an ore containing a light-coloured metal, of what nature I have not skill enough to determine, but have kept specimens (iron pyrites) ; coal also abundant. The Kubos say it is petrified charcoal of teak, in which opinion I am inclined to agree, as I saw several blocks of that wood, which were undergoing the change, parts of which were burnt and appeared the same as the coal : total time travelling this day six hours.

13th—Roused by a concert similar to that of yesterday morning ; a bear, which had been growling nearly the whole night on the opposite side of the river, came in the morning to have a look at us. Before I could get my gun ready to salute him, he walked off. Three hours after leaving yesterday's halting place, reached a rapid called Khyuk-taceng, where the boats were obliged to be unloaded ; and after about three hours more, a second, where a like precaution was necessary. Neither of these rapids is of a greater length than 40 yards : the last which is named Chum-ka-te, is the worst, being, as far as I could judge, a fall of about 10 feet; its difficulties are increased by large and loose rocks, over which it rushes. The obstacles offered to the navigation of the Maglung by these rapids might I conceive be overcome by digging small canals, for which there is sufficient room : even as it is, however, the river is perfectly practicable for dingees, such as the one I am embarked on, and would be more so were the rocks in the bed removed, which I understand the raja intends doing : the only precaution necessary is to unload and carry the loads for about 40 yards. Immediately above and below the rapids the river is as still nearly as a

pond. A short distance above the last rapid, reached the site of a village called Chum-ka-te, and put to for the night: here also are salt springs. Total time moving this day, eight hours.

14th—Reached the junction of the Kumbut and Maglung rivers without meeting any impediment from rapids; the point where the above rivers unite is about eight miles east of Wetup, and in the Kubo valley. The village of Mo, from whence is the ascent of the pass leading to Pa-tche-ne, across the Angoching, is distant from hence about one and a half mile. East at the last-named village are most extensive salt springs, which supply the whole of the southern division of Kubo, and Nga villages to the west of it, with salt. Total time moving this day, seven and half hours.

N. B.—The general width of the valley of the Maglung is about two miles, that of the river about 120 yards: its course upwards nearly east and west, except where it rounds the bases of the different ranges of hills, which it does by turning for a short distance to the north; in places throughout its course it is confined by a steep or abrupt face of rock. The hills from both sides terminate at, and slope gradually down to, its bed, leaving a gap for its egress to the Ningthee*. I have no doubt a road might be made through the valley: it must necessarily, however, be very circuitous, and the river crossed frequently; drawbacks which would more than counterbalance the advantages to be derived from it. That the river might, with great advantage, be made available for transporting grain and other stores by boats from the Kubo valley to the Ningthee, my trip up it places beyond a doubt. The shore on either side is covered to the water's edge with a forest of teak, saul, keú, cotton, (semul,) wood oil, (gurjun,) and other noble trees, similar to those of the Kubo valley, and actually swarms with wild beasts, of the descriptions already mentioned in this journal; throughout the whole course of the river through the Angoching hills, there is not a space of ten yards free of paths made by them down to the water, which gives the idea of a crowded population. In the neighbourhood of the Ningthee, fish are most abundant; the Manipurees (inordinate fish-eaters), who accompanied me, were regularly satiated with it: amongst others, I recognized the roo muchlee, cutla, mirga, kulbause, poontea, large and small, bowali, soli, mullet, pufta, gurri, and various others of which I know not the names; but all of which my Bengalee servants recognised as similar to those found in the Surma at Sylhet. I had also prawns of an immense size brought me, and porpoises were amusing themselves in the Ningthee.

* It is to be regretted that the course of the Maglung was not given in the sketch map from which Plate VII. is lithographed.—Ed.

15th—Wetup, about eight miles west; road good, and similar to that throughout all parts of the Kubo valley. Just after starting I was joined by my suwaree elephant, the mahout still trembling from the effects of a fright he had received about three hours before. His story was, that being tired with riding, he had dismounted to recreate himself with a walk, having put his coolie to supply his place on the elephant; he had got about twenty paces ahead, and was jogging along merrily, when he heard a rustling in a thick bush on the road side: thinking it caused by a deer, his curiosity led him to take a peep, and pushing aside some of the branches, a deer was there sure enough, but it was a dead one, and also a live tiger, which he was not prepared to expect; the latter on being disturbed at his meal, gave a growl and raised his phiz to within a few inches of that of the terrified mahout, who retreated as fast as his fright would permit to the elephant, and took up a position on its tusks. The coolie also saw the tiger, and was in an equal fright with the mahout. The parties remained reconnoitring each other for about five minutes, when some sepoys and Kubos coming up, the tiger retreated, casting many an anxious look towards the bush which contained the remains of the deer, which were seized on as a good prize by the Kubos. The deer could only have been killed a few hours, as it was perfectly fresh and still warm. The tiger had made a breakfast on one hind-quarter and part of the other; a tolerable lunch, however, as the deer was a very large one of the species called in Hindustan "Bara Singhi."

16th—Num-muldah nala; this road, having already been frequently reported on by Lieut. PEMBERTON, renders it unnecessary for me to say any thing about it.

17th—Pausa ditto; ditto ditto. A village has been established here, since visited by Lieut. PEMBERTON, of six families, or about forty inhabitants. Just previous to my arrival, a poor Naga had been frightened *entirely* out of its wits, and *half* out of his life, by a tiger; he was on his way from the hills to the village, close to which he had arrived, when he was surprized by a smart slap from behind on his most prominent and fleshy part, and at the same time a basket which he was carrying pulled from him. On turning round to see who it was that was taking such liberties, he saw a tiger walking off with the basket; he did not stop to reclaim it, but made the best speed he could to the village, bearing marks of the truth of his story on the part before mentioned. The head-man of the village told me, with a very serious face, that he was fearful the "Lace" was displeased in consequence of some omission of the proper respect and attention due him, and took this means of showing it: but he hoped to be able to appease him by

proper offerings; which he proceeded forthwith to prepare in the shape of some of the best rice and vegetables procurable, cooked with great care and many prayers. The mess when ready he placed under a banyan tree on the outside of the village. If the "Lace" partook of it within the two succeeding days, it would be a sure sign his anger had evaporated. As he knew I was anxious, he said, regarding the welfare of the village, he would let me know in a day or two how matters stood.

18th—Tummoo; here I was detained for three days in deciding a case, or rather three cases of witchcraft! Motives of humanity induced me to undertake the business, as persons labouring under such an accusation become regular outcasts; whom no village will receive within its precincts; with whose children, male or female, no other family will intermarry; the whole of whose property is seized by the village from which they are expelled. Exclusive of the above, the husbands of two of the women who were accused had been of the utmost service to me as guides in my different trips through Kubo, and otherwise useful from their intelligence and knowledge of the country. The favour with which I consequently treated them was I doubt not one of the causes of their misfortunes, and induced a wily old Kubo to intrigue to get them out of the way of his own prospects. Part of the penalties had already been inflicted previous to my arrival; they had been turned out of the village, and the greater part of their property seized. On the morning after my arrival I assembled the whole village, the accused being also present, and tried to reason with them on the absurdity and folly of believing in witchcraft. I was laughed at for my pains, and told by one or two of the elders that I might as well try to convince them, there was no sun in heaven, as no witches. Finding all remonstrances and arguments were vain, I proposed the ordeal by water usual on such occasions, and called on the persons who were suffering under the supposed witches' incantations to stand forth, that they as well as the witches, as is customary, should undergo it. This caused a demur and whispering, which ended in a request, begging me to defer farther proceedings till next day, to allow them to consult together on the subject, in which I acquiesced. I was almost assured that the same superstition which led to the belief in witchcraft would prevent any persons from coming forward to stand the proposed test, as the accuser, they say, unless actually convinced in his own mind of the truth of his accusation, is sure to draw down signal punishment on himself and family for having made it; besides he is heavily fined by the village, should the result of the ordeal be contrary to his assertion. Even were I disappointed in the hope, that no per-

sons would come forward, I had no doubt the result of the ordeal would be favourable to the witches, as I should be present at it to see fair play. On the next morning, the villagers avowed that none of them would undergo the ordeal, and that consequently the accusation was unfounded: they returned all their property to the accused, re-instated them in their houses, paid a small fine for having brought forward the charge without sufficient grounds, and gave a written acquittal, which I signed, to the supposed witches. Thus the matter was settled satisfactorily to all parties, except the old rascals who originated it and were obliged to return their ill-acquired spoil. I thought the persons who were accused would of course agree with me as to the absurdity of believing in witchcraft. I was however mistaken, as even they expressed their firm conviction of its existence with others, though themselves innocent. The ordeal on such occasions is as follows: The accuser and accused are bound separately, hands and feet, together, so as not to have the power of moving either; they are placed on the inner edges of two canoes, which are placed a foot separate; after some formalities, prayers, &c., are gone through, the canoes are suddenly pulled from under them; if the accused be really a witch, she floats, and the accuser sinks: the case is reversed should the accusation be false. One end of the rope with which the hands and feet are bound, is sufficiently long to allow of its being held by a person in the boat, in readiness to pull up the party that sinks.

The route from Tummoo to Manipur has already been reported on by Lieut. PEMBERTON; it is only therefore necessary to observe, that since he travelled it, villages have been established at most of the places on the line of road, for the purpose of facilitating the communication.

V.—*Note on the Chiru Antelope.* *By* B. H. Hodgson, *Esq.*

[Read at the meeting of the 20th instant.]

Having recently received a fine female specimen of the Chiru Antelope of Tibet, besides two more very complete spoils of the male of the species, I conceive I cannot do better than throw into the form of a synoptical character (to avoid prolixity) all the leading and distinctive marks of this most rare and singular animal.

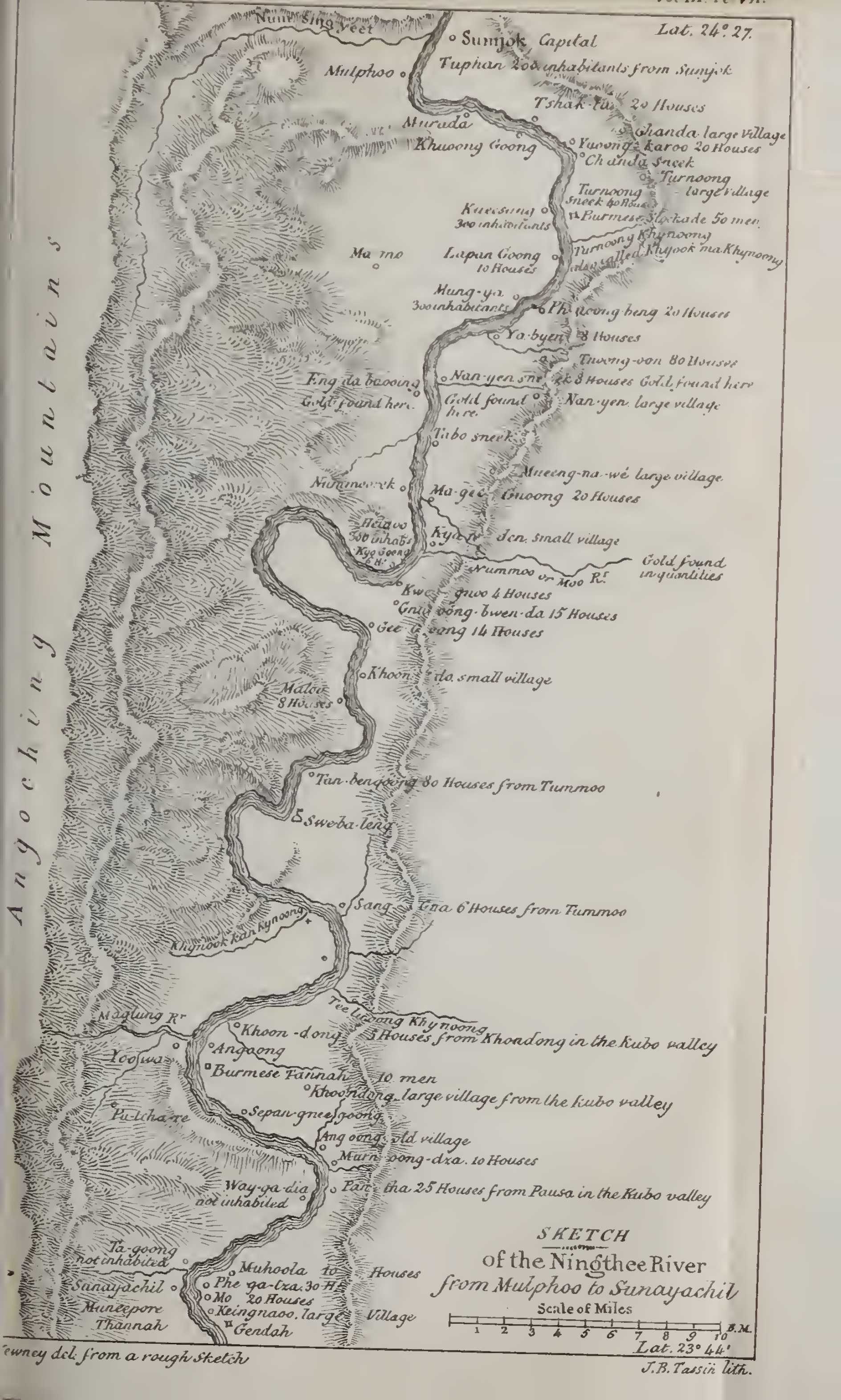
Genus ANTILOPE.

Subgenus GAZELLA, *H. Smith.*

Species, G. HODGSONII, *Abel.*

The Chiru of North-East Tibet.

Gregarious on open plains.


Lat. 24° 27.
Sumjok Capital
Tuphan 200 inhabitants from Sumjok
Mulphoo
Tshak-Tu 20 Houses
Muruda
Khuoong Goong
Chanda large Village
Yuoong-karoo 20 Houses
Chanda Sneek
Turnoong large village
Turnoong Sneek 40 Houses
Burmese Stockade 50 men
Lapan Goong 10 Houses
Ma mo
Mung-ya 300 inhabitants
Ya-byen 8 Houses
Twong-von 80 Houses
Eng-da-baooing Gold found here
Gold found here
Nan-yen large village
Tabo sneek
Mueeng-na-wé large village
Ma-gee Gnoong 20 Houses
Heiaoo 300 inhabs
Kya-jen small village
Nummoo or Moo R.
Gold found in quantities
Gnu oong-bwen-da 15 Houses
Gee-goong 14 Houses
Khoon-do small village
Malow 8 Houses
Tan-bengoong 80 Houses from Tummoo
Sweba-leng
Sang-gna 6 Houses from Tummoo
Khynook kan kynoong
Maglung R.
Yoowa
Angoong
Burmese Tannah 10 men
Khoondong large village from the Kubo valley
Pu-tcha-re
Sepan-gnee goong
Ang oong old village
Marn-oong-dza. 10 Houses
Way-ga-dia not inhabited
Pan-tha 25 Houses from Pausa in the Kubo valley
Ta-goong not inhabited
Sunayachil
Muneepore Thannah
Muhoola 10 Houses
Phe-ga-tza. 30 H.
Mo 20 Houses
Keingnaoo. large Village
Gendah
A n g o c h i n g   M o u n t a i n s
SKETCH
of the Ningthee River
from Mulphoo to Sunayachil
Scale of Miles
1 2 3 4 5 6 7 8 9 10
Lat. 23° 44'
J.B. Tassin lith.

C. Hodgsonii. Length of the male, from snout to rump, four feet eight inches: height, before, two feet eight inches; behind, two feet 10 inches: horns, with a sinus in the core, from 22 to 27 inches long, slender, black, sub-erect, sublyrate, inserted between the orbits, approximated at bases, and strongly compressed; towards the points round and turned forwards, 12 to 20 annuli, which are round-edged, independent, very prominently displayed to the front, striated to the sides and back; large inguinal purses, as in *Dorcas*; no suborbital sinus; nose perfectly clad, broad, bristly; aperture of the nostrils wide, and furnished on the outer side with an accessary enlargement or intermaxillary pouch: ears, short, pointed, substriated: tail, short and full: hoofs, low and compressed forwards, spread and padded behind; fur very thick and porrect, of two sorts, hairy and woolly: the hair, quill-like and brittle; the wool sparc, applied to the skin, and very fine; no bands on the flanks, nor brushes on the knees; no congenital callosities on knees or sternum; rarely artificial ones on the former: size medial, with very compact structure, full of grace and vigour; the limbs cast in the finest mould: colour, above, bright rufous; below, white: the face and fronts of the limbs, entirely brown-black. The female, smaller, hornless; inguinal purses less than in the male; two teats; no marks on the face or limbs. In both sexes the palate is colourless, but the naked skin of the lips and nostrils, jet black.

Major H. Smith having provisionally ranged our animal with the Oryges, with a conjecture that it might be found to belong to the Reduncine group, it is proper to add that the Chiru cannot, with any propriety, be classed under either of those *racemi*, as designated by himself, and that this species belongs unquestionably to his Antelopine or to his Gazelline subgenus. Hornless females would give it to the former. But lyrate horns, no suborbital sinus, and ovine nose, affine it rather to the latter, under which, accordingly, I have disposed it.

The Chiru, however, with his hollow-cored horns, his intermaxillary pouches, and his bluff bristly nose, united to a figure and manners resembling exactly those of the beauteous Gazelles and Antelopes proper, is, in many essential respects, a conspicuous novelty, and, but that I apprehend the prevailing disposition of the day is to carry classification beyond the limits of accurate knowledge, I would have placed the Chiru in a new subgenus created for his reception, and denominated Pantholops. The Byzantine writers so called the supposed unicorn, and we all know how resolutely the Tibetans insisted for years that such was their Chiru.

Should any one object to my synoptical character, that it contains some distinctive points of a generic or even larger quality, I have only to observe that until our classification be amended, the thing cannot be helped, without omitting essentials. For example, the genus Antelope

has been separated from Capra and from Damalis by the circumstance of the cores of the horns being solid in the former and sinused (so to speak) in both the latter. Nevertheless, I am well acquainted with three* species, besides the Chiru, in which the cores of the horns are *not* solid, though the whole four are still retained (and of necessity) in the Antelopine genus. It would be easy to multiply instances, from the best and most recent works, of new sub-genera, which have been set up upon the strength of diagnostics of far from *general* prevalence, that when you come to examine carefully, the several species classed under any one of them, the rule too frequently turns out to be the exception! For example, the subgenus Næmorhœdus is chiefly designated by the presence of the intermaxillary pouch: but of the three species contained in it, two are perfectly familiar to me (Ghoral and Du Vaucellii), and neither has a trace of any such organ.

Nipal, 25th February, 1834.

VI.—*Comparative Section and Tonnage of English and Indian Boats for River Navigation.*

The advantage to the internal commerce and agriculture of this country, likely to arise from the improvement of the communications both by land and water, are too well known to require pointing out: but the means of effecting this improvement appear to be very much neglected; and the object of the following observations therefore is to shew to those interested in the inland navigation of Bengal, the manner in which they may benefit themselves by reducing the cost and facilitating the conveyance of goods by water carriage.

The alteration in the present system recommended is a better construction of the boats, both in their proportions and in the manner of building them; and, as examples are more satisfactory to general readers, than theory or calculations, a table is given, containing the dimensions of several boats used for river and canal navigation in England, and for the sake of comparison, a few boats now in use on the Hoogly river.

Names of Rivers.	Dimensions of the boat.			Burthen.		Greatest section. sq. feet.	Ratio of burthen to sec.	Remarks.
	Length feet.	Breadth feet.	Drght. feet.	Tons.	Bazar mds.			
Thames,.... ..	70	12	3	45	1215	32½	37	
Thames and Severn Canals,	66	16	5	75	2025	70	29	
	80	12	3½	56	1512	37	41	
Severn, ...	120	18	5	100	2700	79	34	
Cam, ...	45	9	2-8	18	486	19	25	
Canal boats, ..	70	6-10	3	27	729	20½	35	mean 35
Hoogly river,	34	14	5		1230	61	20	
	26	12	3½		450	38	12	
	28	8½	3¼		360	25	14	
	22	9½	2		270	17	16	mean 15½

* Viz. Thâr, Ghoral, and Vaucellii.

The few examples stated in this table have been taken indifferently from a collection of the dimensions of boats used in twenty different rivers in Europe, and from an equally numerous list of country-boats.

The resistance that a boat meets with in passing through the water being proportional to its greatest section immersed, the last column in the table has been added for the purpose of shewing the number of maunds the boat can carry for each square foot in its greatest section. This column is the best criterion by which an opinion may be formed of the comparative advantages of the proportions of any two boats; their burthen, and the proportion between their resistance and their greatest section, being the same.

Dimensions of Boats proposed for the Navigation of the Rivers of Bengal.

Burthen in bazar mds.	Length, feet.	Breadth, feet.	Depth, feet.	Crew, one manjee & dandies.	Greatest section, sq. feet.	Ratio of section to burthen.	Remarks.
			f. i.				
1500	72	12	3	11	32	48	The weight of a boat with its crews & stores on board is about one-third of the load that it will carry.
1200	66	11	2 9	9	26½	44	
900	60	10	2 6	7	22	40	
650	54	9	2 3	6	17¾	37	
460	48	8	2	5	14	33	
310	42	7	1 9	4	10¾	29	The size of the sail is usually 30 sq. feet for every foot of greatest section of the boat.
190	36	6	1 6	3	8	25	
110	30	5	1 3	2	5½	21	
57	24	4	1	1	3½	16½	

From the last column of the first table it appears, that the average load of a country-boat is $15\frac{1}{2}$ maunds for each foot of section, while the average of the English boats is 35 maunds; and if one tracker is allowed for every three feet of section, or six or seven men to track 100 maunds in a country-boat, the same work can be equally well done by three men in a boat of the improved proportions. This comparison is not strictly correct, as the boats compared are not of the same burthen: but if the country-boats in the first table be compared with boats of equal burthen in the last table, the proportion will be found to be as $15\frac{1}{2}$ to $32\frac{1}{2}$. This comparison shews how a saving of half the crew may be made. The economy of using large boats instead of small, is in like manner pointed out by the last column of the second table. It may be here necessary to remark, that the stability, and of course the safety, of boats of this proportion, when under sail, will exceed that of country-boats, as much as the former exceeds the latter in length, the section of both being the same, and the size of the sail bearing such proportion to the greatest section as has been already remarked.

Economy is not the only point to be considered in the conveyance of goods; regularity, certainty, and expedition are of equal importance:

from a want of these essentials the hire of a country-boat is 100 per cent. per annum, on the capital expended, or the price of the boat and stores; and the insurance of a four months' voyage is more than that to England. As an example, it may be stated, that a boat that can carry 500 maunds of goods, will, if in constant employment, earn 360 rupees a year, while the same boat may be purchased for 200 or 300 rupees. If 12 per cent. per annum is allowed for the interest of capital, and the boat requires repairs equivalent to replacing it every five years, 360 rupees a year will allow of 1125 rupees being expended in the construction of the boat. For this money, the boat could be built in such a superior manner, and the supply of stores made so complete, as to set at defiance the ordinary risks attending the navigation of the Ganges, and the insurance would in consequence probably not exceed $\frac{1}{4}$ per cent. per mensem. T.

VII.—*Climate of Seringapatam.* Latitude 12°45′ N. Long. 76°51′ E.

Being desirous of including within the pages of the Journal all the data necessary for a meteorologist, to judge of the contingencies of pressure and temperature on the whole continent of India, we extract the following results of a meteorological journal, kept for two years at Seringapatam, from Brewster's Edinburgh Journal of Science, No. 5.

The original registers were kept by Mr. SCARMAN in 1814 and 1816. They were abstracted and reduced to order by Mr. J. FOGGO, Junior.

The mean temperature of the whole year is by observation 77.06. The mean at sunrise is 63°.17: at 3 P. M. 90°. 95:—of the day, 84°, of the night, 70°. 11. The average daily range of temperature 27°. 7. The curve of mean temperature has two convex summits, in May and October, corresponding with the sun's passage twice over the latitude of the place. The highest temperature is 115°, and the lowest, 48°.

The mean temperature of the river Caveri, observed every day at 6 A. M. and 6 P. M. is 77.2 agreeing exactly with that of the air.

The average height of the barometer is 27.568, whence the elevation of Seringapatam may be calculated to be 2412 feet above the sea, assuming the sea level, 29.88, and the temperature of the intercepted column of air, 78°.

The average diurnal tide between the hour of 10 A. M. and 4 P. M. is 0.074 inch. During the prevalence of the south-west monsoon, the extent of the variation is diminished. The monthly variation also proceeds with great regularity, the whole range being 0.262. For the last three months of 1816, the register was extended to the hour of 8 P. M. and the average height of the barometer at that hour is 0.006 *lower* than at 4 A. M.

The prevailing winds are the north-east and south-west, or the general monsoons of the Indian Ocean. The south-west sets in during the month of April. When it commences, its reciprocation with the north-east wind interrupts the serenity of the weather; and during its continuance, thunder storms occur almost every day, with heat-lightning at night. This is the rainy season, but the monsoon having deposited its superabundant moisture upon the ghats, very little rain falls at Seringapatam. During the north-east monsoon, which begins about the end of October, the weather is settled and fine, with heavy dews before sunrise.

Range of the Thermometer, &c. in 1816.

Months.	Mean temperature at sunrise.	Mean temperature at 2½ P. M.	Mean daily range of temperature.	Mean monthly temperature.	Monthly difference from annual mean.	Evaporation.	Rain.	Proportion of winds.		
								n. e.	s. w.	var.
	°	°		°		inch.	inch.			
January,	54°	84°	30	69°	—6.7	8.83	0	30	1	0
February,	58	91	30	74	—1.7	10.17	0.30	24	5	0
March,	59.5	100	43.5	79.7	+4.0	15.05	0.01	12	17	2
April,	66	100	34	83	+7.3	14.52	2.47	4	26	0
May,	66.5	100.5	34	83.5	+7.8	15 00	5.46	3	28	0
June,	65.2	90.5	25.2	77.7	+2.0	9.27	5.85	1	29	0
July,	64.5	82	17.5	73.2	—2.5	6.60	1.86	0	31	0
August,	62.5	85.5	23	74	—1.7	8.77	1.37	0	31	0
Sept.,	62.2	89	26.7	75.5	—0.2	9.36	0.80	0	30	0
October,	64.5	88.5	24	76.5	+0.8	9.30	4.07	17	13	1
Nov.,	61.5	82.5	21	72	—3.7	7.35	1.51	26	4	0
Dec.,	57	85	28	71	—4.7	8·92	0	28	3	0
Mean,	61.7	89.8	28.1	75.7		123.12	23.7	145	218	3

Range of the Barometer, in 1826.

Months.	Mean Height of the Barometer at				Mean monthly pressure at 32°.	Difference from mean annual pressure.	Daily tide from 10 A. M. to 4 P. M.
	4 A. M.	10 A. M.	4 P. M.	8 P. M.			
January,	27.715	27.763	27.677		27.614	+ .169	0.086
February,	.648	.687	.608		.527	+ .082	.079
March,	.638	.664	.571		.486	+ .041	093
April,	.569	.614	.499		.411	— .034	.115
May,	.539	.559	.478		.373	— .072	.081
June,	.498	.509	.458		.354	— .091	.051
July,	.498	.507	.471		.372	— .073	.036
August,	.502	.514	.470		.372	— .073	.044
September,	.536	.545	.483		.392	— .053	.062
October,	.592	.621	.634	27.578	.461	+ .016	.087
November,	.588	.630	.559	.587	.484	+ .039	.071
December,	.616	.650	.563	.613	.497	+ .052	.087
Mean,	27.578	27.605	27.531	27.592	27.445	range 0.260	0.074

VIII.—*Catalogue of Stars to be observed with the Moon in May*, 1834.

May	Names of Stars.	Mag	Decn.	A. R.
			° ′	h. m. s.
17	52 Leonis	6	+15 5	10 37 37.33
	53 ——	6	11 26	40 31.68
	46 Leo.Min.	4.5	35 7	44 0.68
	u Arg.in Car	5	−57 57	46 48.51
	63 Leonis	4.5	+ 8 15	56 26.96
	(1318)	7	15 19	11 3 1.48
	☽ 1 Limb		11 22	4
	73 Leonis	5.6	14 14	7 10.52
	π Centaur.	4	−53 33	13 27.96
	78 Leonis	4	+11 27	15 16,11
	85 ——	6	16 21	21 2.40
	1 Virginis	6.7	9 4	29 54.23
	2 Virginis	5	9 12	36 43.25
18	1 Virginis	6.7	+ 9 4	11 29 54.25
	3 ——	4.5	7 28	37 19.50
	5 ——	3.4	2 43	42 3.29
	64 Urs. Maj.	2	54 38	45 3.66
	7 Virginis	5.6	4 36	51 26.89
	9 ——	4.5	9 40	56 45.69
	☽ 1 Limb		5 38	59
	11 Virginis	7	6 46	12 1 37.15
	δ Crucis	3	−57 48	6 22.35
	16 Virginis	5.6	+ 4 15	11 55.28
	17 Virginis	6	6 15	14 5.69
	(1434)	7	5 20	19 51.55
	*γ*1*γ* Crucis	2.3	−56 9	22 2.44
	5 Draconis	3.4	+70 43	26 22.58
	31 Virginis	6	7 14	33 33.11
19	8 CanisVen.	4.5	+42 17	12 25 51.66
	25 Virginis	6.7	− 4 53	28 15.20
	*γ*1 ——	4	0 30	33 15.73
	38 ——	6	2 37	44 42.27
	77 Urs. Maj.	3	+56 52	46 42.02
	44 Virginis	6	− 2 53	51 7.50
	☽ 1 Limb		0 30	54
	51 Virginis	4.5	4 37	13 1 22.71
	ι Centauri	3	−35 48	11 19.59
	65 Virginis	6	4 1	14 44.47
	74 ——	6	5 22	23 21.35
	79 ——	4	+ 0 16	26 15.59
	ϵ Centauri	3	−52 35	29 28.29
20	74 Virginis	6	− 5 22	13 23 21.34
	80 ——	6	4 31	26 54.45
	ϵ Centauri	3	52 35	29 27.85
	82 Virginis	5.6	7 50	32 55.47
	(1561) ——	7	6 46	36 16.27
	88 ——	7	5 59	39 38.33
	(1585) ——	7	7 13	46 18.16
	☽ 1 Limb		6 44	50
	(1601) Virg.	7	8 26	55 35.70
	95 ——	6	8 29	57 57.54
	96 ——	6.7	9 31	14 0 11.40
	98 ——	4	9 28	4 4.30
	99 ——	4	5 11	7 20.31
20	21 Bootis	4.5	+52 9	14 10 18.52
	104 Virginis	6.7	− 5 20	18 42.87
	η Centauri	3	41 24	25 1.72
	5 Urs. Min.	4	+76 27	28 4.07
21	2 Libræ	6	−10 55	14 14 30.73
	23 Bootis	4	+52 38	19 32.76
	η Centauri	3	−41 24	25 1.69
	(1651) Lib.	6.7	11 34	28 13.81
	α Lupi	3	46 39	30 54.41
	5 Libræ	6	14 14	36 50.61
	7 ——	5.6	13 26	40 15.04
	13 ——	6	11 11	45 23.77
	☽ 1 Limb		12 32	48
	β Urs. Min.	3	+74 50	51 20.97
	π Lupi	5	−46 22	53 53.28
	21 Libræ	6	15 35	57 23.82
	ζ Lupi	4	51 26	15 0 27.47
	27 Libræ	2.3	8 44	8 6.22
	29 ——	7	14 55	11 46.26
	30 ——	6	14 30	13 48.36
	51 Bootis	4	+37 58	18 14.45
	13 Urs. Min.	3.4	72 26	21 6.73
	37 Libræ	4	− 9 28	25 7.89
22	32 Libræ	6	−16 6	15 18 56.02
	34 ——	6	16 1	21 20.22
	35 ——	6	16 16	23 34.14
	38 ——	4.5	14 12	26 16.66
	41 ——	6	18 44	29 23.22
	43 ——	5	19 7	32 25.09
	44 ——	4.5	15 7	34 45.98
	45 Libræ	5	19 39	43 43.73
	☽ 1 Limb		17 32	47
	9 Libræ	5.6	16 1	51 2.40
	δ Scorpii	2	19 19	55 49.35
	14 ——	4	19 0	16 2 23.16
	(1861) ——	7	19 40	7 19.42
	4 Ophiuchi	5	19 37	14 25.48
	7 ——	5	18 3	17 25.50
23	9 Ophiuchi	5	−21 5	16 22 19.88
	15 Draconis	4.5	+69 8	28 24.08
	24 Scorpii	5	−17 24	32 0.27
	18 Ophiuchi	6	24 19	39 40.39
	(1924) Scor.	6.7	20 7	43 29.15
	24 Ophiuchi	6.7	22 52	46 49.28
	☽ 1 Limb,		21 18	49
	29 Ophiuchi	6	18 37	52 10 79
	28 Scorpii	6	21 19	56 19.48
	(1958) Oph.	6.7	17 22	58 38.31
	22 Urs. Min.	4	+82 18	17 3 20.70
	(1974) Oph.	6	−23 52	8 0.41
	42 ——	3.4	24 49	11 50.75
	(1990) Scor.	6	21 16	14 48,04
	75 Herculis	4	+37 18	17 58.85
	51 Ophiuchi	5	−23 49	21 19.27

IX—*Proceedings of the Asiatic Society.*

Thursday Evening, the 20th March, 1834.

The Rev. Principal W. H. Mill, Vice-President, in the chair.

Read the Proceedings of the last meeting.

Mr. Alexander Csoma de Koros, proposed by Mr. Trevelyan, second-by Mr. J. Prinsep, was elected an Honorary Member.

The Secretary announced that a vacancy had been caused in the office of Vice-President, by the departure of Sir John Franks, when a ballot was held, and the Right Reverend the Lord Bishop of Calcutta was declared unanimously elected.

Read a letter from G. Money, Esq. expressing his wish to withdraw from the Society.

Read a letter from Rev. W. Yates, stating that he would prefer publishing his Translation of the Nalodaya in this country, on his own account, under the patronage of the Asiatic Society, with the hopes that the Asiatic Society would, in addition to their own subscription, forward the specimens to the Oriental Translation Fund, with a recommendation that they should also patronize the work, or adopt it on the list of their publications. *Referred* to the Committee of Papers.

Read a letter from the Assignees of Mackintosh and Co. forwarding proposals for a lottery of the household property of the late firm, and soliciting the Society as a creditor to invest a portion of its claim in the same, at 2,000 rupees per ticket, there being 2,500 tickets, and 14 prizes, valued at a total of 5,20,000 rupees.

Moved by Mr. Bagshaw, seconded by Mr. Hare, and resolved, that the Society cannot entertain the proposal.

Read a letter from J. Robison, Esq. Secretary to the Royal Society of Edinburgh, expressing the thanks of the Society for the present of the XVII. Vol. of their Transactions.

Read a letter from Mr. C. E. Trevelyan, presenting for the Museum, on behalf of His Excellency the Right Hon'ble the Governor General, a native picture representing the interview between His Lordship and the Maharao and Raj Rana of Kota, which took place at Ajmere in January, 1832.

Library.

The following Books were presented :

Proceedings of the Royal Society of Edinburgh for the years 1832-33, Nos. 1 and 2—*by the Society.*

Transactions of the Batavian Society, vol. 15—*by the Society.*

The letters of T. on the employment of the English language as a medium for Native Education—*by the Author.*

The Indian Journal of Medical Science, Nos. 2 and 3—*by Messrs. J. Grant and J. T. Pearson, Editors.*

Ceylon Almanac, for 1834—*by his Exc. Sir R. W. Horton, Gov. Ceylon.*

[This volume, like the preceding vol. for 1833, contains much original and valuable information on the ancient history, antiquities and geography of Ceylon.]

Madras Journal of Literature and Science, No. 2—*by the Madras Literary Society.*

Abstract of Proceedings of the Cape of Good Hope Association for Exploring Central Africa, drawn up for publication—*by J. C. Chase, Esq. Secretary.*

Map of various routes between Europe and India, comprehending Western and Northern Asia, together with Asia Minor and Egypt—*by Mr. J. B. Tassin.*

Meteorological Registers for January and February, 1834—*by the Surveyor General.*

Translation of Proverbs and Ecclesiastes into the Madagascar language—*by the Madagascar Mission.*

Journal Asiatique, Nos. 67, 68 and 69—*by the Asiatic Society of Paris.*

The following were received from the Booksellers:

Lardner's Cabinet Cyclopedia—Greeks and Romans, 1st vol.

————————————Foreign Statesmen, 1st vol.

Physical.

Read a letter from Sir R. COLQUHOUN, expressing Mrs. HERBERT's desire that the Geological Specimens belonging to the Estate of the late Captain HERBERT should be presented to the Museum of the Asiatic Society.

A further collection of Fossil Bones from the bed of the Jumna works were presented on the part of Captain E. SMITH, Engineers.

The skin and skeleton of a large Rhinoceros were presented for the museum, by Mr. J. H. BARLOW, C. S.

Read a letter from Colonel WATSON, advising the dispatch of 30 maunds of Coal from the new seam discovered by Mr. CRACROFT and himself in the Kasia hills, for trial at the Presidency.

This coal agrees in composition with No. 12 of the table published in the 3rd vol. GLEANINGS, page 283. The seam is from 16 to 20 feet thick, and spreads six square miles in area; indeed it extends through the whole district.

Colonel WATSON explained the particulars of the locality to the Meeting, and exhibited the model of an apparatus on the principle of a suspension rail-rope for the conveyance of the coal down the hill. The height is 4000 feet, and the longitudinal distance 1½ mile, over a very rugged rocky country, where the construction of a road would be attended with great expence.

Read a letter from Major JAMES WILKINSON, Governor General's Agent, Hazaribagh, forwarding a small specimen of coal picked up near Bhullea, a village in Ramghur, 14 miles south of Hazaribagh.

This coal resembles the *Oogadony* lignite, in having an infiltration of white matter (silex?) in its natural crevices. It is a rich lignite: sp. gr. 1.325.

Further specimens of the Aeng coal were forwarded by Mr. WALTERS, commissioner, Arracan.

Read a note on the Chiru Antelope of Nepal, by B. H. HODGSON, Esq.

[This paper appears in a foregoing page.]

Geographical.

1. Journal of the Route from Déra Ghazí Khan, through the Veziri country, to Cabul, by Dr. MARTIN HONIGBERGER, communicated by Captain C. M. WADE, Political Agent at Ludiana.

The following extract from Captain WADE's letter was read.

"This is the route used by the Lohani merchants, the great carriers of the trade between India and the countries beyond the Indus, and it has never to my knowledge been before traversed by an European traveller.

Dr. Honigberger is a native of Transylvania and a man of education and science. He has travelled through Turkey, Asia Minor, Egypt, Bagdad, and thence come to the Punjáb in 1827, by the way of Sindh. While in the Punjáb he entered the service of Maharaja Runjit Singh, and was of great use to him in shewing his people an improved method of making gun-powder, and in giving his physicians some lessons in pharmacy; but as he did not think the Maharaja placed sufficient value on his services, he applied for his discharge, which was reluctantly granted; and he is now on his way to Europe by Bokhara and Khiva. During his stay at Cabul, he has been employed in company with Mr. Mason in exploring the antiquities in that neighbourhood; he has sent me an account of their labours, which I shall have the pleasure to translate and communicate hereafter."

[The Journal will be printed as soon as the route map can be prepared.]

Antiquities.

Read some remarks upon the ancient inscription (called No. 2, by Lieut. Burt), on the Allahabad pillar, by Captain A. Troyer, Secretary, Sanscrit College, &c.

[This paper is printed in the present number.]

A short note by the Secretary on the subject of the oldest inscription, No. 1, was also read.

The Secretary exhibited to the members present the valuable and interesting collection of reliques and coins discovered by M. le Chevalier Ventura, General in the service of Maharaja Runjit Singh, on opening the Tope of Manikyala in 1830, and presented by that officer to himself some months since. They were obligingly conveyed to Calcutta under charge of Colonel Sir J. Bryant, Mem. As. Soc.

[The description of these precious antiquities must unavoidably be postponed until drawings can be prepared to illustrate them in a becoming manner.]

X.—*Scientific Intelligence.*

1.—*Royle's Illustrations of the Botany of the Himalaya Mountains.* Part I.

The first number of Mr. Royle's vast undertaking has made its appearance within little more than a year from the arrival of the author in England. It contains ten excellent lithographic plates, coloured; one of Zoology (the Alpine hare) and nine of Botanical subjects*, including 15 plants of Upper India and Cashmere. The letter-press description of these is postponed, to allow space for a copious preliminary memoir on the natural history and climate of Upper India and the hills, the field of the author's labours and observations.

* Anemone discolor; Ranunculus polypetalus; Isopyrum grandiflorum and microphyllum; Delphinium Cashmerianum; Aconitum heterophyllum; Cimicifuga frigida; Meconopsis aculeata; Corydalis Cash. and goviana; Tauscheria desertorum; Viola serpens, reniformis and Kanawurensis; Grewia elastica.

From these we would fain make more ample extracts than our limited space will allow, and we can confidently assure all who would be acquainted with the features, the climate,—botany,—mineralogy of the hills, that they will be well rewarded by a perusal of the whole essay. The Court of Directors have placed at Mr. Royle's disposal the portion of Dr. Wallich's collection, which he had not himself the opportunity of publishing; Major General Hardwicke also put into his hands ten volumes of drawings made in the plains of Upper India, and while travelling 30 years ago in the Himalayas; but neither of these have been broached as yet, owing to the ample and novel stores accumulated by himself.

Of the vegetable productions of the neighbourhood of Seháranpúr, its *khadir* and *bangur*, or high and low land; and of the *Dehra Dun*, we have a correct view from the author's own pen, in the first volume of the Journal*. To this he has on the present occasion added very largely, particularly in the part relating to the hills themselves: dividing the slope of the Himalaya into three several belts, and treating each separately. The first belt extends to 4 or 5000 feet of elevation, and comprehends most of the Flora of temperate climes, with some remains of tropical forms, *Butea frondosa*, *Carissa sepiaria*, *Justicia adhatoda*, *Nyctanthes arbor tristis*, *Grislea tomentosa*, *Sterculia villosa*, *Kydia calycina*, and *Leea aspera*. *Nerium Oleander* is found at the base of these mountains, as in Syria and Barbary, along the banks of streams. The mangoe and the *gloriosa superba* attain an elevation of 4000 feet.

The second belt embraces the space between 5 and 9000 feet; the limit to which the herbaceous plants of tropical genera extend. The third, thence to the highest limits, to which snow melts away on the southern face of the Himalaya. The bounds are necessarily but ill defined, and differ greatly on the northern aspect of the mountains.

The arboreous vegetation of the mid region corresponds almost entirely with that of temperate climates;—*Quercus*, *Acer*, *Ulmus*, *Carpinus*, and the different pines; of smaller trees, there are species of *Cornus*, *Benthamia*, *Euonymus*, *Rhamnus*, *Rhus*, *Ilex*, *Andromeda*; of shrubs, *Berberis*, *Buxus*, *Daphne*, *Cratægus*, and *Coriaria*, &c.; of fruit trees, *Juglans regia*, *Armeniaca vulgaris*, *Persica vulgaris*, and *Punica granatum*, with species of *Pyrus*, *Cerasus*, *Rubus*, and *Morus*. But it is quite impossible to excerpt any thing like a complete catalogue of the riches of this genial clime, where man, as De Candolle observes, attains the greatest perfection.

The splendid pines and cedars form the ornaments of the highest range at 11,000 feet elevation. *Quercus semicarpifolia* is the principal forest tree at the highest limits—below, other species of *Quercus*, with *Taxus*, *Betula*, *Acer*, *Cerasus*, and *Populus*. The smaller trees of highest resort, and shrubs, are *Juniperus*, *Salix*, and *Ribes*.

It is remarkable that one of the bamboo tribe is found at elevations of 10,000 feet;—it is allied to the *Chusquea* of Quito. Of the cultivation at this elevation, Dr. Gerard and Capt. Webb have furnished particulars. Buckwheat and barley flourish at 11,600 feet.

In addition to the author's former observations on the plants collected by his emissaries in the valley of Cashmere, we find the following note derived from M. Jacquemont's visit:

"The valley of Cashmere, situated between the 34th and 35th parallels of latitude, in the most northern part of the Himalaya, and to which we descend from the

* Account of the Scháranpur Botanic Garden, i. 41.

snow-clad summit of Peerpunjal, is described as being of an oval form, encircled by mountains clothed with vegetation, which are themselves girded by a higher range covered with snow. The level of the valley is of considerable extent, being about 60 miles in length, and 40 in breadth; its elevation is estimated by the late lamented traveller M. JACQUEMONT to be 5248 to 5576 feet; he, however, states that the beauty of this valley has been much exaggerated, both by his countryman, BERNIER, and by Mr. FORSTER. But there is no doubt that in consequence of its being copiously watered by numerous streams, lakes, and canals, there is considerable moisture both of soil and climate, and almost constant verdure; [he knew not of the late famine:] while the numerous gardens, and the great variety of fruit trees, and of beautiful flowers, must always strike visitors from the arid plains of India, whether Europeans or Asiatics, as Abul Fuzl. From the mixed nature of the cultivation, the climate must evidently be mild and temperate, for even in the warmest months of summer, the breezes which descend at night from the mountains are always cool and pleasant: the periodical rains consist of gentle showers, and the snows which fall in winter cannot remain long on the ground. The Flora of Cashmere has a great resemblance to that of European countries, but the moisture of the climate and its mild temperature in the season of vegetation, causes so great an extension of the herbaceous parts, as well as of the flowers of plants, that many of them rival in luxuriance those of tropical countries." The mildness and moisture are indicated by the culture of rice, melons, gourds, and cucumbers. The kidney-bean thrives well—also the egg-plant, capsicum; marsh-tree mallow, wheat, barley, saffron; turnip, raddish, beet-root; clover, &c. Of trees, the walnut, aspen, poplar, plane, and willow are named as most common. Fruit trees are so common as to constitute a jungle.

The author passes under review, also, the valley of Nipal—the several river valleys and passes of the great chain—Kunawar, Bussahir, &c. He even digresses to the Neelgherries of the peninsula, to show that a similarity exists in its vegetation and climate with that of the lower ranges of the northern chain; but we must now close our imperfect sketch of the contents of this first number, regretting only that we are from our iguorance of the science so little able to select and set before our readers the points which must have the greatest value in the eyes of a Botanist. Every Botanist in India will, however, possess the work; and possessing, prize it.

2.—*Analysis of the Edible Moss of the Eastern Archipelago.* By W. B. O'Shaughnessy, *M. D. Asst. Surg. H. C. S.*

The third number of that meritorious work, the India Journal of Medical Science, contains an able analysis of this curious delicacy of the Chinese materia culinaria, the substance of which we venture to transfer to our pages, as coming properly within the scope, to which the motto on our title page confines, or rather extends, our investigations.

The edible moss is a small and delicate fucus, of a white colour, and flattened filiform shape. The longest of the separate individuals in the specimens examined by Dr. O'S. did not exceed two inches from the ciliary processes, corresponding to the root, to the extreme of the ramifications, which were not very numerous or regular. Dr. O'S. names it the *fucus amylaceus*, from its remarkable and important peculiarity of containing a large proportion of pure starch.

Digestion in cold water for 24 hours separated a portion of gum, and the soluble alkaline salts:—this branch of the analysis proved it to differ from the Iceland

moss in containing no bitter principle. Another portion was cut into very minute shreds, and boiled for 24 hours in distilled water, which was renewed as fast as it evaporated. On cooling, the liquid gelatinized, holding suspended an abundance of the undissolved ligneous shreds. The jelly was transparent and colourless; neither acid nor bitter; gave no precipitate with tincture of galls, and only a transitory blue tinge with iodine. The ligneous fibre yielded a trace of wax on boiling in alcohol; after which, ground to a fine powder, and boiled in distilled water, the solution struck a fine deep blue with iodine, from the starch present: scarcely a particle of the starch can be taken up by simple boiling until after trituration. The woody fibre incinerated gave a small residuum of earthy salts and iron. The quantitative composition deduced from Dr. O'SHAUGHNESSY's analysis is as follows:

Vegetable jelly,	54.5
True starch,	15.0
Wax, a trace,	0.5?
Ligneous fibre,	18.0
Gum,	4.0
Sulphate and muriate of soda,	6.5
Sulphate and phosphate of lime,	1.0
Iron, a trace,	0.5?
	100.0

With regard to the best mode of rendering the moss available as an article of diet, we extract the following judicious observations:

"In the first place, from the tendency of *pectin* or vegetable jelly to form insoluble compounds with saline and earthy bases, it is necessary to steep this fucus for a few hours in *cold rain water* as the first step in its preparation. This removes a large portion, if not the entire, of the sulphate of soda, leaving all the gelatine and starch. It should next be dried by the sun's rays, and *ground to a fine powder*: I say *ground*, for cutting or pounding, however diligently or minutely performed, still leaves the amylaceous globules so mechanically protected, and so closely involved in an external sheath of tough ligneous fibre, that scarcely a particle of the starch can be extracted by boiling, even though the decoction is prolonged for several hours. When *ground*, boiling for 25 minutes or half an hour dissolves all the starch and gelatine. The solution while hot should be passed through muslin or calico, and thus the ligneous fibre is removed; lastly, the strained fluid should be boiled down till a drop placed on a cold surface gelatinizes sufficiently.

"With milk and sugar, and flavoured with lemon juice or sherry, this substance when prepared as I direct, would afford the invalid a pleasant article of diet, especially at sea, where other jellies or their materials cannot be so easily preserved. As I am informed that this fucus is found abundantly on the eastern coast of Bengal, I entertain considerable hopes of its being hereafter found available also in several processes of art and in various manufactures."

The wide field of vegetable chemistry has been hitherto nearly untrodden in India; and yet there is no country where it offers a richer harvest of curious and novel results. We hope Dr. O'SHAUGHNESSY's talents, once directed to the subject, will be fixed on this difficult branch of chemical analysis. He has already acquired in England the peculiar skill and experience in recognizing and separating the numerous and complicated principles of which organic substances are composed, that alone can give confidence in such analyses, and ensure their general acceptance by chemists.

XI.—European Science.

De Candolle's Theory of the Rotation of Crops.

It is a well-established fact in the practice of husbandry, that a succession of the same kind of crops on the same piece of ground, deteriorates not only the ground, but the crops. Thus, a successive crop of wheat, barley, or oats, on the same land, destroys the stamina of the ground, and renders each succeeding crop less in produce and value. A succession of wheat, barley, and oats, frequently repeated, will produce the same effect, though not so quickly. Even a succession of green crops will affect both the crops and the soil in a similar manner, in a given time.

This deterioration of soil and crop, is most perceptible when there is no intermediate application of manure. Manure will, no doubt, protract the period of greatest deterioration; but manure cannot constantly maintain a profitable return from a succession of the same kind of crop. Besides, it is impossible to obtain a sufficient quantity of manure for frequent intermediate applications, in order to counteract all the effects of deterioration. The impossibility of maintaining to perfection the same kind of vegetable on the same piece of ground in a well cultivated garden, illustrates, in a striking manner, the limited powers of manure. In the field, where the cereal crops always ripen their seed, the power of manure is still more limited. These evil effects, arising from what is emphatically and properly called *over-cropping*, have, therefore, been established beyond doubt.

To obviate the serious evil of deterioration of soil and crop, which neither labour merely, however dexterous, nor manure, however well prepared, can prevent, the adoption of a succession of different kinds of crops has been attended with beneficial results. Thus a green crop, such as grass, turnips, or potatoes, was made to succeed a corn crop; and when this alternation of crops was substituted for a successive series of corn or grain-crops, experience soon discovered that less deterioration affected any crop of the series, or the land itself. It was also found, by this arrangement, that a longer period might elapse, than by the former, between the applications of manure, without diminishing the gross produce of the intermediate crops.

In the progress of experience, this beneficial arrangement of cropping was discovered not to bestow all the advantages of which the alternate system was capable. It was well to cause the gentler sway of the green crop to succeed the severer energies of a corn one; but it left the important question undecided, whether the particular corn crop selected was the most proper one by nature to follow its predecessor. Thus, it would be an improvement on the old series of cropping, to make wheat follow grass, barley after potatoes, and oats succeed turnips; but is wheat the best successor to grass of any of the corn crops? and, in like manner, a similar question might be asked of the rest of the series. Experience again suggested, that a better arrangement might be followed. It said, let wheat follow a bare fallow, potatoes, or beans; let barley succeed the turnip, and let oats be taken after the grass.

The trials of experience suggested yet better arrangements, to secure the greatest produce of the different kinds of crops. It was soon discovered that all kinds of soils were not adapted to the most luxuriant growth of all the kinds of crops. Thus a clay soil was found to suit wheat better than barley; a bare fallow better than turnips; and beans better than potatoes. A gravelly soil on the other hand, was most suited to those crops which were rejected by the clay soil.

All these different changes and alterations suggested by experience, in the succession of crops, and the soils which are best suited to them, produce this irrevocable result :—that a particular corn crop shall succeed a particular green crop, on the soil that is best adapted to them ; and that manure shall be applied, at given intervals, with one of the green crops, or with bare fallow. Thus, on strong soils, wheat must follow a manured fallow, grass after wheat, oats after the grass, then beans after oats, and wheat to precede the manured fallow after the beans. On weak soils, barley succeeds to turnips which have been manured, grass follows the barley, and oats precede the manured turnips.

Experience having proved that these successions of corn and green crops, on their respective soils, are best suited to insure the greatest produce, it is requisite that one series of successions shall follow another, in regular order, on its respective soil. These series of successions are called the "*Rotation of crops.*" Should any alteration be desired in the rotation, it can only consist of a substitution of one corn crop for another, or one green crop for another ; for the corn and green crops must always stand in the same relative position to each other. But this substitution of one crop for another will generally be attended with a sensible deterioration in the crop or soil, if the deterioration be not counteracted by an additional quantity of manure. A modification may be effected in the rotation by extending the time which it occupies. Thus the rotation on strong soils, which embraces six years, may be extended to seven or eight ; and that of four years, on weak soils, may be extended to five or six years. The extension of the length of the rotation must be effected alone through the gentle, or the green, and not the severe or corn class of crops ; and that not by means of any of the green crops indiscriminately. Thus the extension must not be effected by a repetition of any of the corn crops ; for, we have already observed, such a proceeding would hasten their own deterioration ; nor by adding an alternate green and corn crop to the end of the rotation, for that would be a mere attempt to deteriorate the soil by delaying the application of manure ; nor by repeating the turnip or potatoe crop, for neither can be raised without manure ;—but it must be effected by allowing the grass to remain as many years longer as it is desired to extend the term of the rotation. The period of grass crop can alone be extended without trouble.

Experience again steps forward to check speculation in the endurance of the grass crop. On strong soils it is inimical to the grass crop to prolong its existence beyond one year, and hence annual grasses and the six years' rotation is best suited to that class of soils ; whereas, an extension of the existence of grass on the weaker soils, serves to strengthen the energy of the soil. Two at least, or perhaps three years of grass confers a lasting benefit on such soils. Having thus fixed upon the length of rotation which is best adapted to the soil, let it be irrevocably adhered to.

In the establishing of this beneficial system of cropping, experience alone has discovered the progressive steps which have led to its completion. The rationale of the system has never been inquired into by those who have administered its rules or benefited by their application. The investigation of causes is the duty of the philosopher, and not of the farmer, who has only to deal with effects ; but the happiest results may be anticipated from the combined efforts of both ; when the former directs his mind to establish the principles upon which the experienced operations of the latter depend.

Among all the important practices in husbandry, that of the rotation of crops is the most important ; for by an attentive adherence to it, the utmost regularity of

work will be maintained through every department of labour. To a steady adherence to this practice is justly ascribed all the improvements on land which have attracted the admiration of every lover of this country : to it is properly attributed the regular apportionment of an invariable extent of land, which is annually devoted to the growth of culmiferous crops ; and which regularly checks, as far as human means can, injurious fluctuation in the supply of the first necessary of life : and to it is accurately imputed the supply of the immense numbers of high-fed live-stock which daily grace our markets.

To the intelligent agriculturist it is delightful to learn that the discoveries of science tend more and more to develop those principles which his practice illustrates. That practice has hitherto kept " the even tenor of its way," by the guidance of unerring experience, amid the contempt of scientific reproach. It now receives its justification in the confession of scientific error.

Various reasonings have hitherto been employed by men of science to account for the necessity of a rotation of crops. It has been thought sufficient to explain all the phenomena to state, that different plants absorb different juices from the same soil, and, therefore, though the ground may be exhausted by one class of vegetables, it may be rich enough for another. But it is well known to botanical physiologists, that plants absorb all the soluble substances which the soil contains, whether injurious to their growth or not. It has also been stated as an explanation, that the roots of different plants, being of different lengths, extend into different layers of the soil, and thus derive from it adequate nourishment. But the roots of all plants must be in the same stratum at the period of germination, and it is besides probable that all the arable part of the soil is homogeneous. It is known that plants of the same family, such as clover and lucerne, do not prosper in succession, although their roots are of different lengths. These theories are therefore not satisfactory.

Brugmans stated that a portion of the juices which are absorbed by the roots of plants, are, after the salutiferous portions have been extracted by the vessels of the plant, again thrown out by exudation from the roots, and deposited in the soil. This idea has been more fully pursued by De Candolle, who sees in it the true theory of the rotation of crops. He thinks it probable, that it is the existence of this exuded matter, which may be regarded in some measure as the excrement of the preceding crop of vegetables, that proves injurious to a succeeding vegetation. He has compared it to an attempt to feed animals upon their excrements. The particles which have been deleterious to one tribe of plants, cannot but prove injurious to plants of the same kind, and probably to those of some other species, while they furnish nutriment to another order of vegetables. Hence why one kind of corn crop is insured by immediately succeeding another of the same kind ; hence why different kinds of crop may with advantage succeed one another ; hence in short, the propriety of a rotation of crops.

To subject these theoretic views to the test of experiment, M. I. Macaire has made many experiments to prove that vegetables exude matter from the roots, and which are related by him in a memoir inserted in the Transactions of the *Société de Physique et d'Histoire Naturelle* of Geneva*. After various attempts to raise plants in pure siliceous sand, pounded glass, washed sponge, white linen, he decided upon pure rain-water. After cleansing and washing the roots thoroughly, he placed them in vials with a certain quantity of pure water. After they had put forth leaves, expanded their flowers, and flourished for some time, he ascertained, by the evaporation of the water, and the use of chemical re-agents, that the water

* See Edinburgh New Philosophical Journal, No. xxviii. p. 215.

contained matter which had exuded from the roots. He satisfied himself that this is the fact with respect to nearly all those plants which display their flowers.

"Several plants of *Chondrilla muralis*, perfectly clean, were placed with their roots in pure water. At the end of a week, the water was yellowish, and emitted an odour like opium, and had a bitter taste. Subacetate and acetate of lead produced a brownish flocculent precipitate, and a solution of gelatine disturbed its transparency. As a proof that this matter was an exudation from the roots, it was found that neither pieces of the root nor of the stem, when macerated in the water during the same time, occasioned either taste, smell, or precipitate.

"To prove that plants employ the excretory power of their roots, in order to get rid of hurtful substances which they may have imbibed, the following experiments were made. Some plants of the *Mercurialis annua* were washed in distilled water, and placed so that one portion of their roots dipped into a weak solution of acetate of lead, and another branch of the same root into pure water. Having vegetated in this manner very well for several days, the water was tested by hydrosulphuret of ammonia, which proved, by the black precipitate which it formed, that a notable portion of the lead had been absorbed, and deposited by the branch which dipped into the water. Groundsel, cabbage, and other plants, gave the same results. Some plants grew very well for two days in acetate of lead. They were then withdrawn, their roots well washed with distilled water, which being afterwards tested, was found to contain no lead, and then placed to vegetate in rain water. In the course of two days this water was found to contain a small quantity of acetate of lead.

"The same experiments were made with lime-water, which, being less injurious to plants, is preferable to lead. The roots being partly placed in lime-water, and partly in pure water, the plants lived well, and the pure water soon showed the presence of lime by the oxalate of ammonia; and the plants which had grown in lime, and were then transferred with every precaution to pure water, soon disgorged into it a portion of lime.

"Similar results were made with a weak solution of marine salt, and with a like result. There can be no doubt, then, that plants have the power of rejecting by their roots, soluble salts, which are injurious to vegetation. Experiments also proved, that the roots exuded a greater excess of matter under night, than in the day. As it is well known that the light of day causes the roots to absorb their juices, it is natural to suppose that, during the night, absorption ceases, and excretion takes place."

Some of the inferences which M. MACAIRE would deduce from his experiments, are, that the greater number of vegetables exude by their roots substances unfit for their vegetation; that the nature of these substances varies according to the families of plants which produce them; and that some being acrid and resinous, may be injurious; and others, being mild and gummy, may assist in the nourishment of other plants.

But the most interesting experiments to an agriculturist, were made by M. MACAIRE, with the bean, wheat, and potatoe.

The bean lives well in pure water, which continues quite clear, but assumes a yellow colour. Chemical tests and evaporation detect a matter in this water, very analogous to gum, and a little carbonate of lime. It was found that the water in which the bean had lived, was well charged with excrementitious matter. Fresh plants of beans did not live well in it; but to ascertain whether this arose from want of carbonic acid in the fluid, or from the presence of exuded matter which

they repelled, plants of wheat were placed in the water. They lived well ; the yellow colour of the fluid became less intense, the residuum less considerable, and it was evident that the new plants absorbed a portion of the matter discharged by the first. Hence the practice of cropping wheat after beans is justified by this experiment.

Wheat, rye, and barley were subjected to experiment. They do not live well in pure water, probably from the quantity of mineral substances, particularly silex, which they contain. The water in which they vegetated was clear, transparent, without colour, smell, or taste. It contained some salts, alkaline and earthy muriates and carbonates, and only a very small portion of gummy matter. As gummy matter appears to be a good preparation for wheat, which was illustrated in the experiment of the bean, corn-crops which do not give out gummy matter, ought not to succeed each other. And as M. Macaire thinks that plants of corn reject scarcely any thing but the saline matters foreign to vegetation, it is probable that any preparation but by their own kind, would be acceptable to several plants. The practice of preparing soil for corn-crops, by the culture of green-crops, is thus countenanced by experiment.

The potatoe lives well in water, and puts forth its leaves. The water is scarcely coloured, leaves little residuum, gives but little taste, and induces the belief that this is one of the plants whose roots secrete little or nothing of a decided character. This experiment of the potatoe, M. Macaire observes, was made upon a plant at an early stage of development. Experiment would lead to the inference that the potatoe is not a very good preparative for corn-crops, which is known to be the case in practice, unless it is assisted by an extraordinary quantity of manure. All these facts tend to prove the theory of rotation suggested by M. De Candolle.

We hope the chemists of our country will prosecute these interesting investigations of M. Macaire ; and we beg to suggest the following course to be pursued.

Let wheat, barley, and oats, be each subjected to a separate suite of experiments. Let it be ascertained whether the potatoe or the turnip affords the best nourishment to the succeeding corn-plants. Experience indicates the turnip as the best. Then determine which of the three corn-plants will best follow the potatoe and turnip respectively. Experience prefers wheat after the potatoe, and barley after the turnip. The oat is not a favourite after either. Let red and white clovers and rye-grass collectively, be tried after all the corn-plants. Experience points to barley as the best nurse for these grasses, as they may be termed, according to ordinary phraseology. Let it be also ascertained whether the potatoe or the turnip is the better preparative for the grasses. Experience is partial to the turnip. Then let it be determined for which of the corn-plants the grasses make the best preparation. Experience decidedly says the oat. It may be proper to try the grass-plants singly, and from one to three years old. We presume the value of the bean and the pea has been already sufficiently ascertained by M. Macaire. Should any eminent chemist direct his attention to this interesting subject, we shall be happy to insert the details of the experiments.—*Quarterly Jour. of Agriculture.*

We can but repeat the injunctions and the offer of the Editor of the London Journal of Agriculture, should any of our friends be inclined to pursue the inquiry in this country. The effects of the mixed crops, to which the natives are so partial, would be a fertile subject for investigation.—Ed.

Meteorological Register, kept at the Assay Office, Calcutta, for the month of March, 1834.

Days of the Month.	Barometer reduced to 32° Fahr.				Thermometer in the Air.					Depressionof Moist-bulb Thermometer.				Hair Hygrometer.		Rain.	Wind.			Weather.		
	At 4½ A.M.	At 10 A.M.	At 4 P.M.	At 10½ P.M.	Minimum at 5 A.M.	At 10 A.M.	Max. by Reg.Ther.	At 4 P.M.	At 10 P.M.	At 5 A.M.	At 10 A.M.	At 4 P.M.	At 10 P.M.	At 10 A.M.	At 4 P.M.	Inches.	Morning.	Noon.	Evening.	Morning.	Noon.	Evening.
1	,788	,898	,794	,882	74,5	79,6	87,8	83,7	77,1	1,0	4,3	8,5	2,4	95	90		S.	S.	S.	cum. strat.	clear.	clear.
2	,874	,941	,820	,924	75,5	80,0	91,8	85,0	76,2	1,9	5,0	9,0	2,2	95	88		s.	S.	S.	clear.	do	do
3	,830	,905	,737	,810	73,1	80,2	91,0	86,3	77,2	1,0	5,2	10,0	2,0	95	87		S.	S.	S.	mist. at 8 A. M.		do
4	,754	,881	,732	,772	76,0	82,3	93,5	86,7	77,0	1,9	6,1	10,1	1,9	95	86		S.	s.	S.	clear.	clear.	do
5	,800	,888	,768	,865	78,1	82,5	94,2	90,6	78,1	0,1	4,5	12,0	2,7	96,0	85		s,	S.	s.	do	clouds.	do
6	,837	,968	,836	,937	76,7	83,5	90,0	87,0	72,1	1,7	5,7	9,5	3,9	05,0	89	0,62	s.	S.	n.	do mist.	cum. ci.	rain.
7	,882	,956	,860	,906	70,0	80,9	88,9	84,6	76,2	3,7	9,5	11,4	5,7	87,0	86		n.	var.	n.	do	cumuli.	clear.
8	,868	,972	,832	,868	71,8	79,7	90,0	83,7	78,2	5,7	13,5	5,2	11,4	77	74		n.	w.	o.	do	clear.	do
9	,849	,928	,796	,837	70,1	79,7	92,0	83,2	78,2	8,3	14,1	17,4	15,1	74	68		n.	n.	S.	do	do	do
10	,783	,850	,706	,752	72,2	80,7	91,0	85,0	77,1	2,0	5,5	11,3	2,6	95	84		S.	S.	S.	do	do	do
11	,736	,828	,720	,792	77,0	81,4	94,2	87,6	77,2	2,9	5,8	17,6	2,2	92	66		S.	S.	S.	do	do	do
12	,755	,844	,720	,778	78,2	83,7	94,1	87,1	77,0	1,8	6,5	19,3	3,8	94	61		S.	Sw,	S.	do	do	do
13	,720	,790	,644	,733	77,1	84,0	91,5	87,3	81,0	2,9	7,0	8,8	4,6	94	92		S.	S.	S.	do	clouds.	high. wind.
14	,706	,830	,713	,777	77,0	83,4	94,0	88,0	79,6	2,2	6,2	13,0	3,3	94	80		s.	S.	S.	do	clear.	nwr. dry.
15	,593	,724	,684	,764	77,2	84,8	89,1	86,9	79,1	5,2	6,9	8,6	4,8	93	92		S.	s. w.	S.	do mist.	storm.	gathering.
16	,721	,800	,682	,751	77,1	84,0	87,0	86,5	76,8	2,5	6,7	8,3	2,8	93	92		S.	S.	s.	do cum.	nim.	thg. hrd.rn.
17	,684	,815	,752	,808	76,3	82,0	93,8	81,3	72,3	1,7	6,0	7,7	2,3	94	92		o.	sw,	S.	overcast,	cumuli.	clear.
18	,819	,936	,810,	,879	69,2	78,7	89,7	85,2	78,3	0,8	5,5	14,2	8,3	94	75		n.	o,	Se.	clear.	dull,	do
19	,802	,963	,814	,876	74,3	81,5	92,0	89,0	77,3	2,7	7,9	16,8	5,3	87	70		o.	s.	S.	misty.	clear.	do
20	,816	,930	,812	,889	73,1	83,0	91,6	86,2	74,2	1,7	6,4	16,5	4,7	91	70	,20	s.	sw.	S.	clear.	cir.cum.rn	heavy. rn.
21	,861	,984	,840	,889	73,3	80,8	93,0	87,1	81,2	1,3	5,3	18,4	13,5	94	65		s.	var.	o.	do	clear.	cirri.
22	,862	,970	,840	,907	74,0	82,5	91,0	86,8	79,5	3,0	13,5	10,9	8,5	76	86		o.	s.	S.	do	cloudy.	storm. rn.
23	,805	,951	,811	,937	75,6	82,	95,0	85,4	81,2	8,1	11,4	16,9	11,0	81	68		n.	o.	S.	misty.	clear.	misty sky.
24	,860	,970	,842	,916	76,5	83,1	93,0	87,2	78,4	5,7	13,7	18,7	8,7	78	67		n.	n.	S.	clear.	hazy.	clear.
25	,899	,970	,802	,861	73,4	82,4	93,8	87,2	78,0	1,7	9,8	17,0	6,8	84	70		e.	s. w.	S.	dull.	hazy.	do
26	,813	,850	,702	,754	73,5	83,	95,0	87,7	78,1	1,6	8,0	16,1	4,5	88	72		s.	s.	S,	do	dull.	do
27	,684	,738	,638	,728	76,0	83,9	90,0	88,1	79,8	2,0	6,7	8,5	3,5	92	89		S.	S.	S.	thick.	clear.	do
28	,677	,738	,647	,743	78,4	84,0	90,0	89,4	81,0	2,3	5,3	10,3	4,5	94	89		S.	S.	S.	clear.	do	do
29	,710	,800	,714	,765	78,7	84,5	92,1	90,7	79,1	2,7	5,7	9,2	2,0	92	90		S.	S.	S.	do	do	cir. cum.
30	,736	,797	,683	,739	78,4	85,0	93,0	88,9	75,2	3,0	6,0	9,0	6,0	93	91	0,95	S.	S.	n. e.	do	do	storm. rn.
31	,632	,825	,789	,763	73,7	83,2	89,0	85,7	78,4	3,7	7,3	9,4	4,6	92	85		W.	s. w.	S.	do	cumuli.	clear.
Mean,	29,788	,880	,757	,82,8	75,0	82,3	91,7	86,7	77,8	2,8	7,5	12,2	5,3	90	80	1,77	S. monsoon.			squally :—hazy sky.		

The instruments for 10 A. M. and 4 P. M. are suspended in the free air of the Laboratory, those for 5 A. M. and 10 P. M. in the south veranda of a third story near the cathedral. The register thermometer for extremes is also in the same veranda.

For use in Library only